

Introduction

The Ohio Department of Natural Resources, Division of Water is pleased to introduce the new and improved version of our well log and drilling report. The overall content of the well log has stayed the same, though some new data fields have been added. Some of these additions include spaces for recording the casing height above ground, the sustainable yield of the well, whether or not the well is flowing, and the total depth of the well. However, most of the changes are due to the reorganization of the required information into what we believe to be a more logical format. In October, 1995, we mailed copies of a preliminary draft of this new log to all active drilling contractors operating in the state of Ohio, and asked for comments about its content and layout. We received many responses, most very favorable, and a number of the suggestions sent in were incorporated into this new form.

The following pages contain instructions on how to fill out these new well log forms. The well log has been broken up into different sections, each with explanations of what information is required, and with appropriate examples of this information. Also, there is a blank well log form with each blank space numbered. The number in each space is referred to in the text; for a question about a particular space, look up that number in the text. There will be an explanation about what type of information is required for that section of the log. Be aware that, while the explanations discuss "writing in" information on the well log, it is perfectly acceptable to fill out the logs with a typewriter or on a computer that will print out the information on the log with an impact or laser printer. For more information about available computer software, call the Division of Water at the number given below.

A recent, though not new, addition to the well log form is the section devoted to the location of the well in state plane coordinates or latitude and longitude. The Division of Water is striving to obtain the best possible location information for each well log filed, and these coordinates will locate a well with an accuracy of a few feet (or meters). Further explanation about the GPS (global positioning system) units and their use in determining location coordinates is also readily available from the Division of Water by calling the number below.

The well log still has three colored copies attached to it, and the distribution of these copies is the same as it has been in the past: the blue copy is the customer's copy, the pink copy is the driller's copy, and the green copy is the local health department's copy. The original, of course, should be filed with the Ohio Department of Natural Resources, Division of Water, per Ohio Revised Code Section 1521.05 within thirty days after completion of construction of the well. The sections of the Ohio Revised Code relating to filing well log and drilling reports and associated penalties for non-compliance and falsification can be found on pages 2 & 3.

The staff of the Division of Water, Water Resources Section will be more than happy to provide any assistance needed with filling out these new well log forms. Contact our office at 614-265-6739 with any questions. And remember, we are always ready to answer your requests for ground water information. Thank you for your cooperation.

Ohio Law Relating to Filing Well Logs and Well Sealing Reports

Ohio Revised Code, Section 1521.01 Definitions.

- (B) "Well" means any excavation, regardless of design or method of construction, created for any of the following purposes:
- (1) Removing ground water from or recharging water into an aquifer, excluding subsurface drainage systems installed to enhance agricultural crop production or urban or suburban landscape management or to control seepage in dams, dikes, and levees;
 - (2) Determining the quantity, quality, level, or movement of ground water in or the stratigraphy of an aquifer, excluding borings for instrumentation in dams, dikes, levees, or highway embankments;
 - (3) Removing or exchanging heat from ground water, excluding horizontal trenches that are installed for water source heat pump systems.
- (C) "Aquifer" means a consolidated or unconsolidated geologic formation or series of formations that are hydraulically interconnected and that have the ability to receive, store or transmit water.
- (D) "Ground water" means all water occurring in an aquifer.
- (F) "Person" has the same meaning as in section 1.59 of the Revised Code and also includes the United States, the state, any political subdivision of the state, and any department, division, board, commission, agency, or instrumentality of the United States, the state, or a political subdivision of the state.

Ohio Revised Code, Section 1521.05.

- (A) As used in this section:
- (1) "Construct" or "construction" includes drilling, boring, digging, deepening, altering, and logging.
 - (2) "Altering" means changing the configuration of a well, including, without limitation, deepening a well, extending or replacing any portion of the inside or outside casing or wall of a well that extends below ground level, plugging a portion of a well back to a certain depth, and reaming out a well to enlarge its original diameter.
 - (3) "Logging" means describing the lithology, grain size, color, and texture of the formations encountered during the drilling, boring, digging, deepening, or altering of a well.
 - (4) "Grouting" means neat cement; bentonite products in slurry, granular, or pelletized form, excluding drilling mud or fluids; or any combination of neat cement and bentonite products that is placed within a well to seal the annular space or to seal an abandoned well and that is impervious to and capable of preventing the movement of water.
 - (5) "Abandoned well" means a well whose use has been permanently discontinued and that poses potential health and safety hazards or that has the potential to transmit surface contaminants into the aquifer in which the well has been constructed.
 - (6) "Sealing" means the complete filling of a abandoned well with grouting or other approved materials in order to permanently prevent the vertical movement of water in the well and thus prevent the contamination of ground water or the intermixing of water between aquifers.
- (B) Any person that constructs a well shall keep a careful and accurate log of the construction of the well. The log shall show all of the following:
- (1) The character, including, without limitation, the lithology, color, texture, and grain size, the name, if known, and depth of all formations passed through or encountered;
 - (2) The depths at which water is encountered;
 - (3) The static water level of the completed well;

- (4) A copy of the record of all pumping tests and analyses related to those tests, if any;
- (5) Construction details, including lengths, diameters, and thicknesses of casing and screening and the volume, type of material, and method of introducing gravel packing and grouting into the well;
- (6) The type of pumping equipment installed, if any;
- (7) The name of the owner of the well, the address of the location where the well was constructed, and a description of the location of the property where the well was constructed;
- (8) The signature of the individual who constructed the well and filed the well log;
- (9) Any other information required by the chief of the Division of Water.

The log shall be furnished to the division within thirty days after the completion of construction of the well, upon forms prescribed and prepared by the division. The log shall be kept on file by the division.

In accordance with Chapter 119 of the Revised Code, the chief may adopt, amend, and rescind rules requiring other persons that are involved in the construction or subsequent development of a well to submit well logs under this division containing any or all of the information specified in divisions (B)(1) to (9) of this section and requiring any person that seals an abandoned well to submit a well sealing report under this division containing any or all of the information specified in those divisions and any additional information specified in the rules.

- (C)(1) No person shall fail to keep and submit a well log as required by this section.
 - (2) No person shall make a false statement in any well log required to be kept and submitted under this section. Violation of division (C)(2) of this section is falsification under section 2921.13 of the Revised Code.
- (D) For the purposes of prosecution of a violation of division (C)(1) of this section, a prima facie case is established when the division obtains either of the following:
 - (1) A certified copy of a permit for a private water system issued in accordance with rules adopted under section 3701.344 [3701.34.4] of the Revised Code, or a certified copy of the invoice or a cancelled check from the owner of a well indicating the construction services performed;
 - (2) A certified copy of any permit issued under Chapter 3734 or 6111 of the Revised Code for any activity that includes the construction of a well.

Ohio Revised Code, Section 1521.99 Penalties

- (A) Whoever violates division (C)(1) of section 1521.05 of the Revised Code is guilty of a misdemeanor of the fourth degree.

Revised Code, Section 2921.13

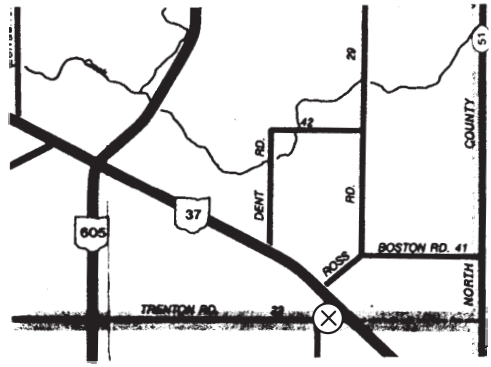
Whoever violates division (C)(2) of section 1521.05 of the Revised Code is guilty of a misdemeanor of the first degree.

Revised Code, Section 2929.21

- (A) Whoever is convicted of or pleads guilty to a misdemeanor other than a minor misdemeanor shall be imprisoned for a definite term or fined, or both.
- (B) Terms of imprisonment for misdemeanor shall be imposed as follows:
 - (1) For a misdemeanor of the first degree, not more than six months.
 - (4) For a misdemeanor of the fourth degree, not more than thirty days.
- (C) Fines for misdemeanor shall be imposed as follows:
 - (1) For a misdemeanor of the first degree, not more than one thousand dollars.
 - (4) For a misdemeanor of the fourth degree, not more than two hundred fifty dollars.

Well Location

WELL LOCATION	
County _____ 1	Township _____ 2
Owner/Builder (Circle One or Both) _____ 3	First _____ Last _____
Address of Well Location _____ 4	Number _____ Street Name _____
City _____ 5	Zip Code +4 _____ 6
Permit No. _____ 7	Section/Lot No. _____ 8 (Circle One or Both)
Location of Well in State Plane coordinates, if available: _____	Use of Well _____ 9
N <input type="checkbox"/> X _____ +/- _____ ft. or m	
S <input type="checkbox"/> Y _____ +/- _____ ft. or m	See Box Below
Elevation of Well _____ +/- _____ ft. or m	
Datum Plain: <input type="checkbox"/> NAD27 <input type="checkbox"/> NAD83 Elevation Source _____	
Source of Coordinates: <input type="checkbox"/> GPS <input type="checkbox"/> Survey <input type="checkbox"/> Other _____	
Sketch a map showing distance well lies from numbered state highways, street intersections, county roads, buildings or other notable landmarks. If latitude and longitude are available please include here: Lat: _____ Long: _____ North	
See Box Below	
South	

EXAMPLE WELL LOCATION	
County <u>Delaware</u>	Township <u>Trenton</u>
Owner/Builder (Circle One or Both) <u>E. J. Fudd</u>	First _____ Last _____
Address of Well Location <u>181 Green Cook Rd.</u>	Number _____ Street Name _____
City <u>Sunbury</u>	Zip Code +4 <u>43074-9761</u>
Permit No. <u>960.95</u>	Section/Lot No. <u>20</u> (Circle One or Both)
Location of Well in State Plane coordinates, if available: _____	Use of Well <u>Residential</u>
N <input checked="" type="checkbox"/> X <u>195339</u> . <u>425</u> +/- <u>20</u> <u>(ft)</u> or m	
S <input type="checkbox"/> Y <u>1922944</u> . <u>533</u> +/- <u>20</u> <u>(ft)</u> or m	
Elevation of Well <u>1084</u> +/- <u>5</u> <u>(ft)</u> or m	
Datum Plain: <input checked="" type="checkbox"/> NAD27 <input type="checkbox"/> NAD83 Elevation Source <u>Topo map</u>	
Source of Coordinates: <input checked="" type="checkbox"/> GPS <input type="checkbox"/> Survey <input type="checkbox"/> Other _____	
Sketch a map showing distance well lies from numbered state highways, street intersections, county roads, buildings or other notable landmarks. If latitude and longitude are available please include here: Lat: <u>40°12'09"</u> Long: <u>82°46'35"</u> North	
	
South	

- (1)** Write in the county and **(2)** political township in which the well is located. County road maps are readily available from the county engineer's office, usually at no charge.
- (3)** Write in the first and last name (or company name) of the owner and/or builder. Circle the appropriate description.
- (4)** Write in the number and street name for the well location, not the owner's or builder's current address.
- (5)** Note the city and **(6)** zip code for the address given in **(4)**.
- (7)** Write in the permit number, if any. Permits are required for private water system (residential) wells and public supply wells.
- (8)** Note the township section number or sub-division lot number if available.
- (9)** Write in the use of the well, such as residential, irrigation, agricultural, fire protection, public supply, industrial, etc.

State Plane Coordinates

Those with the proper resources (GPS units, topographic maps, survey equipment) should locate the well with state plane coordinates and/or latitude and longitude and provide this information on the form. Also note the land surface elevation of the well, and the source of that measurement (such as a topographic map).

Sketch Map

Everyone must sketch a location map that includes nearest crossroads and distances from intersections, or copy a portion of the county road map and attach it in the sketch map space. Mark the location of the well on it (see example).

Construction Details

CONSTRUCTION DETAILS			
<input type="checkbox"/> Rotary <input type="checkbox"/> Cable <input type="checkbox"/> Augered <input type="checkbox"/> Driven <input type="checkbox"/> Other _____ (10)			
BOREHOLE/CASING (measured from ground surface)			
1 <input type="checkbox"/> Borehole Diameter _____ inches	Depth _____ ft.		
Casing Diameter _____ in.	Length _____ ft.	Thickness _____ in.	
2 <input type="checkbox"/> Borehole Diameter _____ inches	Depth _____ ft.		
Casing Diameter _____ in.	Length _____ ft.	Thickness _____ in.	
Casing Height Above Ground _____ ft. (15)			
Type 1 <input type="checkbox"/> Steel	2 <input type="checkbox"/> Galv.	1 <input type="checkbox"/> PVC	1 <input type="checkbox"/> _____
2 <input type="checkbox"/> _____	2 <input type="checkbox"/> _____	2 <input type="checkbox"/> Other	_____ (16)
Joints 1 <input type="checkbox"/> Threaded	1 <input type="checkbox"/> Welded	1 <input type="checkbox"/> Solvent	1 <input type="checkbox"/> _____
2 <input type="checkbox"/> _____	2 <input type="checkbox"/> _____	2 <input type="checkbox"/> Other	_____ (17)
SCREEN			
Diameter _____ (18)		Slot Size _____ (19)	
Type _____ (21)		Screen Length _____ ft. (20)	
Material _____ (22)			
Set Between _____ ft. and _____ ft. (23)			
GRAVEL PACK (Filter Pack)			
Material/Size _____ (24)		Volume/Weight Used _____ (25)	
Method of Installation _____ (26)			
Depth: Placed FROM _____ ft. TO _____ ft. (27)			
GROUT			
Material _____ (28)		Volume/Weight Used _____ (29)	
Method of Installation _____ (30)			
Depth: Placed FROM _____ ft. TO _____ ft. (31)			

(10) Indicate the type of drilling rig used to construct the well. Check one of the listed options or write in the drilling method used.

Borehole/Casing

(11) Note borehole diameter and depth.

(12) Note casing diameter, length, and thickness set in that borehole.

(13) Note second borehole diameter and depth information, if needed.

(14) Note second casing diameter, length, and thickness information, if needed.

(15) Write in the height of the casing above ground when the well is completed.

(16) Check type of casing used in the well, or write it in if it is not listed.

(17) Check type of joints used, or write it in if it is not listed.

Screen

(18) Note the diameter of the screen installed, **(19)** slot size in inches, and **(20)** length of screen in feet.

(21) Write in the type of screen used, such as wire-wrapped, machine-slotted, louvered, etc.

(22) Write in the material of which the screen is composed, such as PVC, stainless steel, brass, etc.

(23) Note the depths between which the screen is placed.

EXAMPLE

CONSTRUCTION DETAILS			
<input checked="" type="checkbox"/> Rotary <input type="checkbox"/> Cable <input type="checkbox"/> Augered <input type="checkbox"/> Driven <input type="checkbox"/> Other _____			
BOREHOLE/CASING (measured from ground surface)			
1 <input checked="" type="checkbox"/> Borehole Diameter <u>7 7/8</u> inches	Depth <u>127</u> ft.		
Casing Diameter <u>5</u> in.	Length <u>20</u> ft.	Thickness <u>.327</u> in.	
2 <input type="checkbox"/> Borehole Diameter _____ inches	Depth _____ ft.		
Casing Diameter <u>5</u> in.	Length <u>102</u> ft.	Thickness <u>.265</u> in.	
Casing Height Above Ground <u>1</u> ft.			
Type 1 <input type="checkbox"/> Steel	2 <input type="checkbox"/> Galv.	1 <input checked="" type="checkbox"/> PVC	1 <input type="checkbox"/> _____
2 <input type="checkbox"/> _____	2 <input type="checkbox"/> _____	2 <input checked="" type="checkbox"/> Other	_____
Joints 1 <input type="checkbox"/> Threaded	1 <input type="checkbox"/> Welded	1 <input checked="" type="checkbox"/> Solvent	1 <input type="checkbox"/> _____
2 <input type="checkbox"/> _____	2 <input type="checkbox"/> _____	2 <input checked="" type="checkbox"/> Other	_____
SCREEN			
Diameter <u>5 in</u>		Slot Size <u>.050 in</u>	
Type <u>Machine-slotted</u>		Screen Length <u>5</u> ft.	
Material <u>PVC</u>			
Set Between <u>122</u> ft. and <u>127</u> ft.			
GRAVEL PACK (Filter Pack)			
Material/Size <u>#4 Parry sand</u>		Volume/Weight Used <u>400 lbs</u>	
Method of Installation <u>Gravity pour</u>			
Depth: Placed FROM <u>118</u> ft. TO <u>127</u> ft.			
GROUT			
Material <u>Benseal/EZ Mud</u>		Volume/Weight Used <u>175 gal</u>	
Method of Installation <u>Pumped through 1" tremie tube</u>			
Depth: Placed FROM <u>118</u> ft. TO <u>surface</u> ft.			

Gravel Pack

(24) Note the type and size of gravel pack material used.

(25) Note the volume or weight of the material used.

(26) Write in the method of installation, such as gravity pour.

(27) Write in the depths between which the gravel pack is placed.

Grout

(28) Write in the grouting material(s) used, i.e., Benseal/EZ Mud, neat cement, etc.

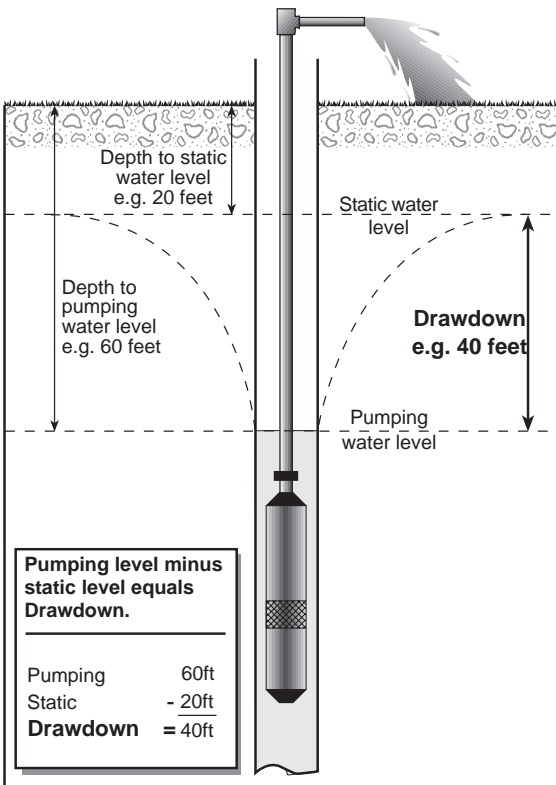
(29) Write in the volume or weight of the material used.

(30) Note the method of installation, such as pumped through a tremie tube, dry driven, Halliburton method, poured, etc.

(31) Note the depths between which the grout is placed.

Well Test

WELL TEST*	
Pre-Pumping Static Level <u>32</u> ft.	Date <u>33</u>
Measured from: <input type="checkbox"/> Top of Casing <input type="checkbox"/> Ground Level <input type="checkbox"/> Other <u>34</u>	
<input type="checkbox"/> Air <input type="checkbox"/> Bailing <input type="checkbox"/> Pumping* <input type="checkbox"/> Other <u>35</u>	
Test Rate <u>36</u> gpm	Duration of Test <u>37</u> hrs.
Feet of Drawdown <u>38</u> ft.	Sustainable Yield <u>39</u> gpm
*(Attach a copy of the pumping test record, per section 1521.05, ORC)	
Is Copy Attached? <input type="checkbox"/> Yes <input type="checkbox"/> No Flowing Well? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Quality <u>40</u>	
PUMP/PITLESS	
Type of pump <u>41</u>	Capacity <u>42</u> gpm
Pump set at <u>43</u> ft.	Pitless Type <u>44</u>
Pump installed by <u>45</u>	



- (32)** Write in the static water level measured after well development but before pumping. If development is the well test, measure the static water level before development begins.
- (33)** Note the date that the static level measurement was taken.
- (34)** Check or write in point from which the measurement was taken.
- (35)** Check or write in the method of testing.
- (36)** Write in the test rate in gallons per minute.

(37) Write in the duration of test in hours.
 The ODNR Pumping Test Record form should be attached to the well log for pumping tests 8 hours in duration or longer per Ohio Revised Code Section 1521.05.

- (38)** Note the feet of drawdown measured (static water level subtracted from pumping water level, see diagram).
- (39)** Give an estimate of the sustainable yield for the well; that is, in a residential well, what is a safe pumping rate for at least 6 to 12 hours of continuous pumping?
- (40)** Write in water quality information, such as ppm or mg/l of iron, sulfate, or manganese, gpg or mg/l hardness, pH, presence of any taste or odor, clear or cloudy, etc.

Pump and Pitless Information

- (41)** Write in what type of pump is installed in the well: submersible, shallow or deep well jet, turbine, hand, etc.
- (42)** Note the production capacity of the pump in gallons per minute for the depth at which it is set.

EXAMPLE WELL TEST*	
Pre-Pumping Static Level <u>20</u> ft.	Date <u>12/10/95</u>
Measured from: <input checked="" type="checkbox"/> Top of Casing <input type="checkbox"/> Ground Level <input type="checkbox"/> Other	
<input checked="" type="checkbox"/> Air <input type="checkbox"/> Bailing <input type="checkbox"/> Pumping* <input type="checkbox"/> Other	
Test Rate <u>35</u> gpm	Duration of Test <u>1</u> hrs.
Feet of Drawdown <u>20</u> ft.	Sustainable Yield <u>25</u> gpm
*(Attach a copy of the pumping test record, per section 1521.05, ORC)	
Is Copy Attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Flowing Well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Quality <u>Clear, 1ppm Fe, 30 gpg hardness, pH 7</u>	
PUMP/PITLESS	
Type of pump <u>Submersible</u>	Capacity <u>10</u> gpm
Pump set at <u>65</u> ft.	Pitless Type <u>Adapter</u>
Pump installed by <u>Acme Drilling Co.</u>	

- (43)** Note the depth at which the pump or intake was set.
- (44)** Write in the type of pitless device used, such as an adapter or pre-assembled unit.
- (45)** Write in the name of the person or company that installed the pump. If it was the homeowner, write homeowner.

Do not delay filing the well log for lack of pump information.

References for Further Information

ASTM Standards On Ground Water and Vadose Zone Investigations, Second Edition, 1994. Available from ASTM, 1916 Race St., Philadelphia, PA 19103. Telephone: 215-299-2632

Manual of Field Geology by Robert R. Compton, 1962. Available from most larger bookstores. Grain size folders based on classifications found in Compton are available from the Ohio Department of Natural Resources, Division of Water, while supplies last. Telephone: 614-265-6739

Munsell Soil Color Charts, 1994 Revised Edition. Available from Kollmorgan Instruments Corporation, 405 Little Britain Rd., New Windsor, NY 12553. Telephone: 800-622-2384

Ohio Topographic Maps pamphlet, 1995. Available from Ohio Department of Natural Resources, Division of Geological Survey, 4383 Fountain Square Dr., Bldg. B-2, Columbus, OH 43224. Telephone: 614-265-6576

List of Consolidated Formations

Consolidated formations encountered while drilling in Ohio	Consolidated formations not encountered in Ohio
Shale	Slate
Sandstone	Granite
Limestone	Schist
Dolomite	Soapstone
Siltstone	
Coal	

Classification of Grain Sizes (Compton, 1962)

Approximate diameter in inches	Name of loose aggregate
>10 in.	Boulder gravel
2.5 to 10 in.	Cobble gravel
1.2 to 2.5 in.	Very coarse pebble gravel
0.6 to 1.2 in.	Coarse pebble gravel
0.3 to 0.6 in.	Medium pebble gravel
0.15 to 0.3 in.	Fine pebble gravel
0.08 to 0.15 in.	Very fine pebble gravel
0.04 to 0.08 in.	Very coarse sand
0.02 to 0.04 in.	Coarse sand
0.01 to 0.02 in.	Medium sand
0.005 to 0.01 in.	Fine sand
0.002 to 0.005 in.	Very fine sand
0.00015 to 0.002 in.	Silt
<0.00015 in.	Clay



Bob Taft, *Governor*
Samual Speck, *Director*
Jim Morris, P.E., *Chief*

