

Guide to Logging Wells for Water-Well Drillers

Describe the logged interval using the basic components of a well log as listed below.

1. Color - Indicate the color of the material, as well as whether it is light or dark. Commonly used colors are

- Red
- Yellow/orange
- Brown
- Gray
- Blue
- Green
- Black

2. Rock/Sediment Type - Use the appropriate county map PDF, which includes a rock type list on the second page and which is accessible from the DCNR [County Rock-Type Maps of Pennsylvania](#) web page, as a guide to what rock types to expect in your area.

It can be very difficult to tell rock type from rock chips. For example, claystone, shale, and siltstone may look the same. Some crystalline rock types may be indistinguishable. However, keen observations that a driller makes can be important information to include on the log. The drilling resistance and rock hardness are important clues for drillers to use in determining the rock type.

Some common geologic rocks and sediments are listed below. The glossary and text on the second page of the county rock-type maps describes most of these.

Igneous or metamorphic rocks

- Coarse-grained crystalline
- Fine-grained crystalline
- Foliated rock
- Marble
- Quartzite

Sedimentary rocks

- Sandstone
- Siltstone
- Shale, claystone
- Conglomerate
- Coal

Unconsolidated sediments

- Clay
- Silt
- Sand
- Pebbles
- Cobbles
- Boulders

3. Carbonate Mineral Composition

A 10-percent solution of hydrochloric acid (HCl) is used to test for carbonate minerals like calcite. HCl can be obtained from chemical-supply companies. Use a bottle dropper to place a few drops of the HCL on a dry rock sample. A “fizz” indicates the presence of carbonate minerals. Testing presents a practical problem for the driller because the cuttings are typically wet. One possible solution is to save and mark a few rock fragments with the depth of the hole and perform the test later on the dried samples. Then record the results on the log.

If the rock is **calcareous**, it will react to dilute HCl. Indicate whether it is a strong or weak fizz.

4. Other Descriptions

Any other observations should be included on the log. Such observations might include the following:

- Mixtures of above rock types or sediments, especially unconsolidated sediments
- Other descriptors, such as voids, relative water quantity, mud, or organic material
- Physical characteristics of the water, such as color or smell (e.g., sulfur smell or water cleared upon purging)

You may use other terminology. The above guide is not all inclusive. Examples include—

- Light-brown shale; water has smell of sulfur
- Red, weakly calcareous sandstone
- Gray, very calcareous sandstone
- Dark-blue-gray, calcareous clay with pebbles and pieces of wood
- Dark crystalline rock, very hard; little water

More information about rocks in general, and the rocks of Pennsylvania and the minerals of which they are composed, can be found in the Pennsylvania Geological Survey publications [ES 1](#) (PDF), *Rocks and Minerals of Pennsylvania*, and [EG 1](#) (ZIP), *Engineering Characteristics of the Rocks of Pennsylvania*.