

Ground Water Level Measurement

FSOP 2.2.2 (November 19, 2015)

Ohio EPA Division of Environmental Response and Revitalization

1.0 Scope and Applicability

- 1.1 Measurement of ground water levels from wells or piezometers is generally required to:
- Provide static water level data to prepare a potentiometric surface map and evaluate ground water flow direction
 - Determine the depth to set a ground water sampling pump
 - Estimate the volume of water to be purged from the well prior to sampling
 - Monitor water level drawdown while purging and sampling or during aquifer testing
- 1.2 This FSOP is applicable to the measurement of ground water levels in monitoring wells, piezometers, water supply wells, soil gas probes and soil borings that intersect the water table.
- 1.3 Measuring water levels may be difficult in some situations, including small-diameter (< 1 inch) monitoring wells, piezometers or soil gas probes. In addition, water supply wells may not provide access for water level measurements and often contain a dedicated pump with plumbing and electrical wiring that can obstruct or entangle a water level probe or pressure transducer.

2.0 Definitions

Not applicable

3.0 Health and Safety Considerations

- 3.1 Consult the instrument's operation manual to determine if it is intrinsically safe when working in an area where there is a potential fire or explosion hazard.
- 3.2 Always review the site-specific health and safety plan (HASP) for site-specific sampling hazards before beginning work.

4.0 Procedure Cautions

- 4.1 The user should be familiar with the instrument operation. Consult the instrument manual for operating instructions prior to use.
- 4.2 Inspect the instrument tape for cuts or abrasions.
- 4.3 The use of electronic water level indicators to measure the depth to water in residential or other wells with pumps and associated plumbing is discouraged, because the tape may become entangled in the downhole plumbing or centralizing disks. If water level measurements must be obtained from such

wells, the pump and plumbing may need to be temporarily removed first, which usually requires the services of a registered water well drilling contractor. Additional disinfection of the well and/or downhole equipment may be required by the county or local health department that has jurisdiction over the well.

- 4.4 Use caution when lowering and raising the tape within a well. A sharp casing edge or burr may damage the tape if it is pulled against the edge of the casing.
- 4.5 Do not use electronic water level indicators in wells known or suspected to contain nonaqueous phase liquids (NAPL). Use an interface meter instead (refer to FSOP 3.1.3, Interface Meter).
- 4.6 If using the water level indicator to measure the total depth of the well, add the length of any probe extension beyond the sensor pin (e.g., 0.3 ft) to obtain an accurate measurement of the total well depth.
- 4.7 Be sure the instrument has charged batteries. Bring spare batteries.
- 4.8 Remove the batteries if the instrument is not going to be used for an extended period of time.
- 4.9 When reeling the tape in, be careful that the tape does not twist, kink or fold.
- 4.10 Always transport the instrument in a protective case or secure the instrument during transport.

5.0 Personnel Qualifications

Ohio EPA personnel working at sites that fall under the scope of OSHA's hazardous waste operations and emergency response standard (29 CFR 1910.120) must meet the training requirements described in that standard.

6.0 Equipment and Supplies

- 6.1 Water level indicator with battery and operation manual
- 6.2 Protective case for instrument transport
- 6.3 Data forms or field book and pen
- 6.4 Well keys and tools needed to open well(s)
- 6.5 Decontamination equipment and supplies
- 6.6 Personal protective equipment appropriate for site-specific work activities

7.0 Procedure

- 7.1 Make sure the electronic water level indicator is functioning properly and the battery is charged. When testing the instrument, use tap water and not distilled water. Distilled water contains no dissolved solids to act as electrolytes and the alarms will not be activated.

- 7.2 Open the well. Allow sufficient time for the water level to equilibrate, especially if the well is installed in a confined aquifer or if air pressure is released (a “pop” is heard) when the well casing cap is removed.
- 7.3 Locate the designated measuring point mark on the casing. For monitoring wells this is generally marked on the highest point or north side of the top of the inner casing. If a mark is not present, use the highest visible point of the inner casing as the measuring point. If the inner casing is level (no discernible high point), use the north side of the casing.
- 7.4 Turn the water level indicator’s switch on to the highest sensitivity position.
- 7.5 Slowly lower the tape down the well, taking caution not to twist the tape or allow the tape to scrape the edge of the casing as it is being lowered. When the tape’s probe contacts water, the instrument’s audible (buzzer) and visual (light) alarms will be activated.
- 7.6 Raise the tape slightly to lift the probe out of the water. The alarm should stop. A mild shake of the tape may be necessary to remove water from the probe’s sensor pin. Lower the tape slightly until the alarms activate and hold the tape firmly against the side of the casing so that the probe does not move up or down.
- 7.7 Carefully read the tape measurement at the well’s measuring point to the nearest hundredth (0.01) foot.
- 7.8 Record the water level reading.
- 7.9 If using the water level indicator to measure the total depth of the well, turn off the instrument. Next, lower the tape to the bottom of the well and record the tape reading at the measuring point. Remember to add the length of any probe extension to the total depth measurement.
- 7.10 Decontaminate the probe and the length of tape lowered into the well in accordance with the decontamination procedures specified in FSOP 1.6, Sampling Equipment Decontamination or the site specific work plan.

8.0 Data and Records Management

Refer to FSOP 1.3, Field Documentation.

9.0 Quality Assurance and Quality Control

Not applicable

10.0 Attachments

None

11.0 References

FSOP 1.3, Field Documentation

FSOP 1.6, Sampling Equipment Decontamination

FSOP 3.1.3, Interface Meter