

Interface Meter

FSOP 3.1.3 (January 17, 2013)

Ohio EPA Division of Environmental Response and Revitalization

1.0 Scope and Applicability

Interface meters (also referred to as oil/water interface probes) are used to measure the depth and thickness of light and dense non-aqueous phase liquid (LNAPL and DNAPL) and depth to ground water in wells. Typically, interface meters consist of a reel, graduated tape and sensor. The reel has an alarm, control switches and a battery pack. The tape has a wire or series of wires encased within it. The sensing probe is connected to the end of the tape which is lowered into the well. When the probe contacts water or NAPL, audible and/or visual alarms will be activated. The probe utilizes an infrared beam and detector. When the probe is lowered into a liquid, the infrared light is refracted triggering audible (buzzer) and visual (light) alarms. In general, if the liquid is relatively non-conductive, such as oil, a steady audible alarm tone will sound and a steady alarm light will be displayed. If the liquid is conductive, such as water, then an intermittent (beeping) alarm will sound and a flashing light will be displayed.

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.
- 3.3 If NAPL or high concentrations of VOCs are suspected to be present in the well, use a PID or FID to screen the breathing space above the well casing before taking measurements.

4.0 Procedure Cautions

- 4.1 The user should be familiar with the operation of the instrument being used. Consult the instrument manual for operating instructions specific to the instrument prior to use.
- 4.2 Inspect the instrument tape to make sure there are no cuts or abrasions that may impair the function of the tape.
- 4.3 The use of an interface meter to measure the depth to water or NAPL in residential or other wells with pumps and associated plumbing is generally 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 generally requires the services of a registered water well drilling contractor.

Additionally, for residential or other water supply wells, there may be additional sanitary requirements for disinfection of the well and/or downhole equipment 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 the tape is allowed to rub against the edge of the casing.
- 4.5 Be sure the instrument has new or charged batteries. Replace old or weak batteries as necessary.
- 4.6 Remove instrument batteries if the instrument is not going to be used for an extended period of time.
- 4.7 Always transport the instrument in a protective case or secure the instrument during transport.
- 4.8 When reeling the tape back in, be careful that the tape does not twist, kink or fold.
- 4.9 If NAPL is encountered, follow the decontamination procedures in FSOP 1.6, Equipment Decontamination before reusing the instrument.

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 Interface meter with battery and operation manual
- 6.2 Protective case for instrument transport
- 6.3 Field log sheet (attached) or field book and pen
- 6.4 Well keys or tools to open well
- 6.5 Decontamination equipment and supplies
- 6.6 Personal protective equipment appropriate for site-specific work activities

7.0 Procedures

- 7.1 Make sure the interface meter is functioning properly and the battery is charged. (**Note:** when testing the instrument, use tap water and not distilled water. Distilled water contains no dissolved solids to act as electrolytes and the alarm may not activate.)
- 7.2 Open the well by removing the lock and cap.

- 7.3 Locate the measuring point elevation mark on the casing. (A surveyed measuring point will need to be established if not already present.) 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, then use the highest visible point of the inner casing as the measuring point.
- 7.4 Turn the instrument's switch on to the highest sensitivity position. Adjust the sensitivity as necessary.
- 7.5 Slowly lower the tape down the well taking care not to twist the tape or allow the tape to scrape the edge of the casing as it is being lowered. If LNAPL is present in a measurable thickness (generally 0.01 foot), the instrument's audible alarm (buzzer) will emit a steady tone and visual (light) alarm will display a steady light. When the instrument's probe contacts water, the audible alarm will emit a beeping tone and the visual alarm will flash. If the instrument is lowered through the water column and encounters DNAPL, then the instrument will sound a continuous alarm similar to when it encounters LNAPL.
- 7.6 Raise the tape slightly so that the probe is out of the water or LNAPL/DNAPL. The alarm signals should stop or change. A mild shake of the tape may also be necessary to remove water from the probe 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 0.01 foot.
- 7.8 Record the water level reading, NAPL reading(s) and supporting information (site, date, time, notes) on the attached field log sheet or in a field log book.
- 7.9 For apparent LNAPL thickness, subtract the LNAPL reading from the water level reading. For apparent DNAPL thickness, subtract the DNAPL reading from the total depth of the well (measured from the top of casing).
- 7.10 Ground water elevations in monitoring wells containing LNAPL should be corrected for the depression of the LNAPL/water interface to obtain total hydraulic head. The depression is caused by the weight of the LNAPL. The correction is performed by multiplying the measured LNAPL thickness by an estimate of the LNAPL specific gravity, and then adding the result to the elevation of the LNAPL/water interface. Approximate specific gravities in grams per cubic centimeter (g/cc) at 20° C (68° F) for common petroleum product sources include the following:
 - Gasoline, 0.74 g/cc
 - Jet fuel or kerosene, 0.80 g/cc
 - Diesel fuel, 0.85 g/cc
 - Motor oil, 0.90 g/cc

The water level correction for LNAPL is very important for determining apparent ground water elevations and preparing accurate potentiometric surface maps.

- 7.11 Decontaminate the instrument 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

Field Log Sheet for Depth to Ground Water and Depth to Nonaqueous Phase Liquids (NAPL) Measurements in Monitoring Wells and Piezometers

11.0 References

FSOP 1.3, Field Documentation

FSOP 1.6, Sampling Equipment Decontamination

