



Abandonment and Decommissioning of Open Earth Borings

Subjects

Abandonment of boreholes, decommissioning of boreholes, groundwater, groundwater protection

Audience

Borehole owners/operators, legislators, regulators, building contractors, exploration drillers, water well contractors, loop well contractors, geotechnical contractors, foundation drillers

Definitions

bore:

A hole made in the ground by drilling or pushing, or the act of making a hole in the ground by drilling or pushing

bore well:

A shallow (10 to 100 ft, or 3 to 30 m), large-diameter (8 to 36 in, or 20 to 90 cm) water well constructed by hand-operated or power-driven augers

bored well:

Synonymous with an augered well or a well dug with a bucket-drill

borehole:

A hole drilled or bored into the earth, usually for exploratory or economic purposes, such as a water well or oil well (United States Environmental Protection Agency 1986); see “open hole” or “wellbore”

exploration drilling:

Procedures during which test holes are drilled for the purpose of evaluating the contents of the ground in a particular area to determine if materials of value are present, and to assess the quality of those materials

geotechnical drilling:

Procedures to remove rock and soil samples to determine whether or not a site will be suitable for the proposed objectives, including soil stability and other subsurface investigations

loop well:

Drilling of the vertical borehole, placement of the loop tube to the bottom of the vertical borehole with the grout tremie, and grouting of the vertical borehole from the bottom of the vertical borehole to the earth's surface at the drill site

monitoring well:

A water well that is constructed within a soil or rock boring for the purpose of determining water levels and monitoring chemical, biological, and physical properties of groundwater

test hole:

A hole designed to obtain information on groundwater quality and/or geological and hydrological conditions, as well as heat transfer characteristics

water well:

An excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed for the purposes of extracting groundwater, monitoring groundwater, using the geothermal properties of the earth, or injecting water into an aquifer or subsurface reservoir

Background

Improperly decommissioned boreholes constructed for any purpose into the earth's subsurface can serve as an uncontrolled introduction point for contaminants of soil and/or groundwater, as well as a risk to public safety.

Issue

Should any borehole into the earth's subsurface for any end purpose, when abandoned, be decommissioned with appropriate fill and grouting materials?

Position

It is the position of the National Ground Water Association that the proper decommissioning of abandoned boreholes into the earth's subsurface for any end purpose is critical to protecting aquifer and groundwater resources. Proper decommissioning and sealing eliminates the decommissioned boring as a conduit for loss of hydrologic pressure in confined formations, intermingling of groundwater of differing quality, and entry of contaminated and polluted water, including surface water runoff and surface erosion. Proper decommissioning shall be performed by licensed/certified earth drilling contractors.

Prior to the abandonment/decommissioning of a borehole, the owner/designated agent or decommissioning company may be required to obtain the necessary permits from the local or state permitting authority.

The basic concept governing the proper sealing of the well or borehole is to maintain the existing hydrogeologic conditions. An unsealed abandoned borehole may constitute a hazard to public health, safety, welfare, and to the preservation of the groundwater resource.

To seal an abandoned borehole properly, several things must be accomplished: (1) prevention of groundwater contamination; (2) conservation of yield and maintenance of hydrostatic head of aquifer(s); and (3) prevention of the intermingling of desirable and undesirable water(s).

Decommissioned boreholes or wells shall be properly sealed to prevent physical injury, entry into the borehole, and contamination of groundwater from:

- solids, gases, or liquids
- commingling of water penetrated by the borehole
- compression of backfill near the surface.

An abandoned borehole shall be decommissioned as soon as possible. Any abandoned borehole that presents an immediate threat to the groundwater resource shall have an action plan initiated by the responsible party within seventy-two (72) hours upon discovery. All boreholes shall be secured and never used for disposal prior to decommissioning.

A well or borehole that has gone dry, is contaminated, or no longer serves a useful purpose is abandoned.

All wells and boreholes that are to be decommissioned shall be opened to original depth. If an obstruction is encountered, the obstruction shall be removed.

If the abandoned well or borehole was constructed and installed with casing and grout and is open to its original depth, and is undamaged, the casing/liner may be left in place.

When the original well or borehole construction is not known, has been damaged, or has not been installed with casing and grout, the casing/liner shall be removed. Where casing/liner removal is not possible, it shall be ripped or perforated to allow the plugging fluid to penetrate the annular space and formation to facilitate proper sealing.

Only locally authorized sealing, fill, and grouting materials may be used as a grout.

Grout shall be emplaced from the original depth to the surface. The well casing shall be cut off below ground level to a depth not to interfere with land use.

If, for any reason, it appears the grout seal has been compromised, it may be necessary to assess the breach and re-grout the deficient borehole seal.

If subsidence in the borehole is found during decommissioning, the borehole should be re-grouted to the original level.

The abandoned and decommissioned well or borehole's location and abandonment procedures shall be documented, including all materials used in decommissioning and where they were emplaced in the well or borehole. All information relative to the decommissioning procedures of the abandoned borehole shall be prepared and assembled, including any requirements of a state or local regulatory agency, with copies supplied to the respective agency and the owner of the land.

For information on abandonment/decommissioning techniques, refer to the *ANSI/NGWA-01-14 Water Well Construction Standard* and/or the *Guidelines for the Construction of Loop Wells for Vertical Closed Loop Ground Source Heat Pump Systems*.

The proper decommissioning of abandoned boreholes into the earth's subsurface for any end purpose is critical to protecting aquifer and groundwater resources.

Contact

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References

ANSI/NGWA-01-14 Water Well Construction Standard, 2014, National Ground Water Association.

Guidelines for the Construction of Loop Wells for Vertical Closed Loop Ground Source Heat Pump Systems, 2010, National Ground Water Association.

NGWA Lexicon of Groundwater and Water Well System Terms, 2013,

National Ground Water Association.

Dates

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The National Ground Water Association is a not-for-profit professional society and trade association for the global groundwater industry. Our members around the world include leading public and private sector groundwater scientists, engineers, water well system professionals, manufacturers, and suppliers of groundwater-related products and services. The Association's vision is to be the leading groundwater association advocating for responsible development, management, and use of water.



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