

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

WATER WELL DECOMMISSIONING

(No.)

CODE 351

DEFINITION

The sealing and permanent closure of an inactive, abandoned, or unusable water well.

PURPOSE

- Eliminate physical hazard to people, animals, and farm machinery; and to prevent entry of animals, debris, or other foreign substances
- Prevent contamination of groundwater by surface water inflow
- Restore the natural hydrogeologic conditions, to the extent possible, by preventing vertical cross-contamination or commingling of groundwaters between separate water bearing zones
- Eliminate the possibility of the water well being used for any other purpose
- Allow future alternative use or management of the site

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to any drilled, dug, driven, bored, or otherwise constructed vertical water well determined to have no further beneficial use, is no longer used, or is in such a state of disrepair that using it to obtain ground water is impractical or a health hazard.

This practice does not apply to water wells that were used for waste disposal.

CRITERIA

Criteria for all purposes will conform to decommissioning procedures presented in ASTM D5299, "Standard Guide for Decommissioning of Groundwater Wells, Vadose Zone Monitoring

Devices, Boreholes, and Other Devices for Environmental Activities."

Use of this standard will comply with all applicable federal, state, and local laws and regulations.

A water well abandoned prior to January 1, 1988, may be plugged by the landowner. Water wells abandoned on or after January 1, 1988, must be plugged by an Indiana licensed water well driller.

Data collection. As-built construction documents, maintenance records, and other available data for the water well will be collected, reviewed, and included in a well decommissioning plan. Existing conditions will be documented as defined in Plans and Specifications.

Well preparation. The well will be cleared of all pumping equipment, valves, pipelines, grease, oil, scum, debris, and other foreign material. Casings, liners, and screens will also be removed, unless impracticable.

Disinfection. Water wells will be disinfected as an integral part of the decommissioning process. Before sealing, the entire column of well water will be brought to an available chlorine concentration of 100 parts per million (ppm) or greater, or other higher chlorine concentration as specified by local, State, Tribal, or Federal requirements. After being agitated in the well water, the solution will remain for no less than 24 hours to assure complete disinfection.

Plugging the well. The well will be plugged by using suitable fill materials, with layers of sealing material emplaced to restrict movement of water vertically in the well.

Sealing materials. Sealing materials used in water well decommissioning will be of sufficiently low hydraulic conductivity to prevent groundwater flow vertically in the well. Properties of sealing materials will conform to characteristics listed in

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service State Office, or download it from the Field Office Technical Guide for your State.

ASTM D5299, part 6.3. Acceptable sealing materials are provided in ASTM D5299, part 6.4 to 6.6. Sealing materials do not require disinfection.

Water to be mixed with sealing materials will be of a quality that conforms to criteria provided in ASTM D5299, part 7.3.3.

Fill material. Fill material will be clean and free of organic or other foreign matter. The fill material will be graded so that bridging will not occur during placement.

Plugging procedures. Sealing and fill materials will be placed in the well only after the well water has been disinfected.

Place fill material from the bottom of the well to the top of the lowest water-bearing zone.

Place sealing material at a minimum thickness of one foot starting at the top of the lowest water bearing zone and successively place at intervals every 10 feet or less throughout the remaining well column.

All material will be placed from the bottom of the well upward by methods that avoid segregation, dilution, or bridging of the material.

For wells greater than 30 inches in diameter, backfill will be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence.

Removal of well casing. If possible, the casing will be completely removed from the well by either pulling or over-drilling (over-reaming) as explained in ASTM D5299, part 7.3.1 and 7.3.8. Casing that cannot be removed completely will be ripped, perforated, or cut off at a depth greater than the maximum potential for frost penetration or any other near surface soil fracturing hazard (such as desiccation), or three feet, whichever is greater.

Casings grouted in place. Casings to be grouted in place will employ a pressurized grouting procedure that will completely fill and seal any open space around the casing. Grout may consist of cement, sand, bentonite, an approved combination of these constituents, or other approved sealing materials.

Casings to be removed from a collapsing formation will be grouted concurrently with removal, so that the bottom of the casing remains submerged in the grout.

Well-head seal. The interval between the ground surface and the top of the cut-off casing will be sealed with materials that conform to ASTM

D5299, part 6.3. These materials may be an extension of the sealing materials used below this depth.

The soil material or sealing materials will achieve an in-place hydraulic conductivity equivalent to or less than the surface soil surrounding the well. The ground surface at the sealed well-head will be mounded and graded in a manner that prevents ponding of surface runoff.

Control of artesian pressure. If a well is under artesian pressure (flowing or not flowing), the grout pressure must be maintained to counteract the artesian pressure until initial grout set occurs. Procedures for balancing pressures during grouting operations will conform to ASTM D5299, part 7.3.7.

CONSIDERATIONS

If allowed by state regulations, fill materials, such as sand, pea gravel, sand-gravel mix, crushed stone or agricultural lime can be used to fill the well, provided that zones of sealing material conform to ASTM D5299, part 6.3.

If feasible, consider adding a metal "target" to the top 3 inches of well-head seal so that the decommissioned well may be easily located with a metal detector.

This practice may be part of a ground water protection system that includes water and chemical management practices.

To the extent practical, an abandoned well should be decommissioned in a manner that restores the original hydrogeologic conditions of the well site and does not preclude the use of the site from future land management practices.

All decommissioning procedures, fill and sealing materials need to be selected with due consideration of the site-specific geological, biological, physical, and climatic conditions; the chemical composition of the surrounding soil, rock, and ground water at the well site; and the well's construction practices. Water well drilling records may be available from the IDNR Division of Water.

PLANS AND SPECIFICATIONS

Plans and specifications for decommissioning a water well will be consistent with this standard and will describe the requirements for applying the practice to achieve its intended purposes. A

record of the installation of this practice will be made and will include the following information:

- Location of the decommissioned well by Global Positioning System, latitude/longitude, township/range, or other georeferencing convention, of such precision that it can be readily re-located
- Date of completion of well decommissioning
- Name of landowner
- Name, title, and address of person responsible for well decommissioning
- Total depth of well
- Age of well, if known
- Installation method (i.e. drilled, driven, jetted, bucket, dug)
- Length of casing
- Length of well screen
- Length of casing removed or length of casing cut off below ground level
- Lengths of casing ripped or perforated and method used
- Inside diameter of well bore or casing
- Type of casing material or schedule (e.g., standard weight steel, or PVC sch-80)
- Static water level measured from ground surface prior to decommissioning
- Photographs before and after decommissioning
- Types of materials used for filling and sealing, quantities used, depth intervals for emplacement of each type, and emplacement method used
- All other pertinent information based on site conditions and any other problems encountered during decommissioning should be documented in detail

OPERATION AND MAINTENANCE

The practice site will be inspected periodically to ensure that the decommissioned well and the adjacent area have not settled or eroded, or are otherwise adversely disturbed. The well site and adjacent ground surfaces will be maintained in a manner that prevents ponding of surface runoff on the site.

REFERENCES

Listed below are references helpful in planning this practice:

- Indiana Code 25-39
- Rule 312 IAC 13-10
- ASTM D5299, Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities.
- Purdue University Cooperative Extension Service Publication
 - Plugging Abandoned Water Wells: A Landowner's Guide, 1998 (WQ-21)
- Indiana Department of Natural Resources Division of Water
402 W Washington St Rm W264
Indianapolis, IN 46204
(317) 232-4160
- Indiana Groundwater Association
7829 Prairie View Drive
Indianapolis IN 46256
(317) 596-9760