

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

WELL DECOMMISSIONING

(No.)

CODE 351

DEFINITION

The sealing and permanent closure of a water well no longer in use.

PURPOSE

- Prevent entry of animals, debris, or other foreign substances into well or well bore hole;
- Eliminate the physical hazard of an open hole to people, animals, and farm machinery;
- Prevent entry of contaminated surface water into well and migration of contaminants into unsaturated (vadose) zone or saturated zone;
- Prevent commingling of chemically or physically different ground waters between separate water bearing zones;
- Eliminate possibility of well being used for any other purpose;
- Conserve yield and hydrostatic head of aquifers;
- Restore, as far as feasible, hydrogeologic conditions that existed before well was constructed.

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.

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

CRITERIA

Closure options shall be compatible with all applicable federal, state, and local requirements including the Well Construction Code of the Missouri Department of Natural Resources (MDNR) Division of Environmental Quality, Wellhead Protection Section (Missouri 10 CSR 23-3.110).

The well owner shall contact the Missouri DNR, before commencing well decommissioning operations, for approval of the plan for plugging a well when the plan deviates from the published Missouri DNR requirements.

Except for landowners decommissioning their own wells located on property they own or lease, persons decommissioning wells, other than hand dug wells, must be permitted by the MDNR.

Criteria for all purposes shall conform to decommissioning procedures presented in ASTM D5299, Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities.

Disinfection shall conform to procedures explained in Ground Water and Wells (Driscoll, 1986, pp. 620-623) or the current requirements of the MDNR Well Construction Code.

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

Well preparation. The well shall be cleared of all pumping equipment, valves, pipelines, casings, liners, screens, grease, oil, scum,

debris, and other foreign material as explained in ASTM D5299, part 7.3.8.

Disinfection. Before sealing, the entire column of well water shall be brought to an available chlorine concentration of 100 ppm or greater, or other solution specified by local or state requirements. After being agitated in the well water, the chemical solution shall be left for no less than 24 hours to assure complete disinfection, unless otherwise allowed by the MDNR Well Construction Code .

Sealing materials. Properties of sealing materials shall conform to characteristics listed in ASTM D5299, part 6.3. Acceptable sealing materials are provided in ASTM D5299, part 6.4. Sealing materials do not require disinfection.

Water to be mixed with grout shall be compatible with the grouting material, and shall be of a quality that conforms to criteria provided in ASTM D5299, part 7.3.3.

Fill material. Fill material shall be clean and free of organic or other foreign matter. The gradation shall be such that bridging will not occur during placement.

Placement of material. Fill material shall be placed into the well only after the well water has been disinfected. Fill material is placed at a minimum thickness of one foot starting at the top of the lowest water bearing zone and successively placed at intervals every 10 feet or less throughout the entire well column. All material shall 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 shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence.

Removal of well casing. If possible, the casing shall be completely removed from the well by either pulling or overdrilling (overreaming) as explained in ASTM D5299, part 7.3.1. Casing that cannot be removed completely shall 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 shall employ a pressurized grouting procedure that will completely fill and seal the open space around the casing.

Perforated or ripped casing shall provide sufficient apportioned open area to assure passage of the grout into the space. The casing shall be perforated or ripped throughout the entire length of a confining layer.

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

Surface seal. The interval between the ground surface and the top of the cut off casing shall be filled with soil material that achieves an in-place hydraulic conductivity equivalent to or less than the surface soil surrounding the well. The ground surface at the sealed well site shall be mounded and graded in a manner that prevents ponding of surface runoff.

Control of elevated formation pressure. If a well penetrates a formation that is under artesian head (confined conditions), or from which a gas is being released under pressure, the grout pressure must be maintained greater than the formation pressure until initial grout set occurs. Procedures for balancing formation pressures during grouting operations shall conform to ASTM D5299, part 7.3.7.

CONSIDERATIONS

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

To the extent practicable, 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 and 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.

Fill materials, such as sand, pea gravel, sand-gravel mix, crushed stone, or agricultural lime

can be used to plug the well provided that zones of sealing material conform to ASTM D5299, part 6.3).

PLANS AND SPECIFICATIONS

Plans and specifications for decommissioning abandoned water wells shall be consistent with this standard and shall describe the requirements for applying the practice to achieve its intended purposes. A record of the installation of this practice shall be made on Missouri Department of Natural Resources' ABANDONMENT REGISTRATION RECORD form MO 780-1603 or its current replacement.

OPERATION AND MAINTENANCE

The practice site shall 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 shall be maintained in a manner that prevents ponding of surface runoff on the site.

REFERENCES

Driscoll, Fletcher G. 1986. Ground Water and Wells, St. Paul, MN: Johnson Division, pp. 620-623.

Missouri Department of Natural Resources, Division of Environmental Quality. Well Construction Code - 10 Code of State Regulations (CSR) 23-3.110.

Missouri Department of Natural Resources, Geological Survey and Resource Assessment Division. Eliminating An Unnecessary Risk: Abandoned Wells and Cisterns Fact Sheet 5.

Sample Missouri DNR ABANDONMENT REGISTRATION RECORD form.
 Contact Missouri DNR (573) 368-2165 to obtain copies of the form or download from
www.dnr.mo.gov



MISSOURI DEPARTMENT OF
 NATURAL RESOURCES
 GEOLOGICAL SURVEY AND RESOURCE
 ASSESSMENT DIVISION
 (573) 368-2165

**ABANDONMENT
 REGISTRATION RECORD**

OFFICE USE ONLY		DATE RECEIVED	
REF. NO.			
C.R. NO.		CHECK NO.	
STATE WELL NUMBER		TRANSMITTAL NO.	
ENTERED Ph 1	Ph 2	APPROVED BY	ROUTE /
	Ph 3		/

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR			
OWNER NAME		TELEPHONE	
OWNER ADDRESS		CITY	STATE ZIP CODE
ADDRESS OF WELL SITE (IF DIFFERENT THAN ABOVE)		CITY	STATE ZIP CODE
SITE NAME	WELL NUMBER	INFORMATION VERIFIED BY OWNER SIGNATURE (WELL OWNER) X	DATE

SKETCH THE LOCATION TO THE WELL INCLUDING MILEAGE ON ALL ROADS TRAVELED FROM NEAREST TOWNS OR HIGHWAYS	LOCATION OF WELL	AREA _____
	LAT. _____	ELEV. _____
	LONG. _____	COUNTY _____
		SMALLEST _____ LARGEST _____
		SEC. _____ TWN. _____ N RNG. _____ E OR W

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE	DRILLER NOTES:

ABANDONMENT INFORMATION

FORMER USE OF WELL		ORIGINAL DRILLER (IF KNOWN)	DATE ORIGINALLY DRILLED (IF KNOWN)	STATIC WATER LEVEL
<input type="checkbox"/> HAND DUG <input type="checkbox"/> DOMESTIC <input type="checkbox"/> MULTI-FAMILY <input type="checkbox"/> PUBLIC WATER SUPPLY <input type="checkbox"/> HEAT PUMP	<input type="checkbox"/> IRRIGATION <input type="checkbox"/> SOIL BORING/GEOPROBE <input type="checkbox"/> MONITORING <input type="checkbox"/> MINERAL EXPLORATORY TEST HOLE <input type="checkbox"/> OTHER _____	DEPTH OF THE WELL	LENGTH OF CASING	CASING DIAMETER
GROUT INSTALLATION METHOD		PUMP REMOVED FROM WELL?		DRILL HOLE DIAMETER (IF KNOWN)
<input type="checkbox"/> GRAVITY <input type="checkbox"/> TREMIE <input type="checkbox"/> EXCAVATION	GROUT MATERIAL USED <input type="checkbox"/> NEAT CEMENT <input type="checkbox"/> BENTONITE <input type="checkbox"/> HI-EARLY <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input type="checkbox"/> OTHER _____ <input type="checkbox"/> TYPE 1 <input type="checkbox"/> CHPS <input type="checkbox"/> PELLETS	<input type="checkbox"/> YES <input type="checkbox"/> NO	WAS THE CASING CUT OFF THREE FEET BELOW GROUND SURFACE? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> REMOVED	TYPE OF CASING <input type="checkbox"/> PLASTIC <input type="checkbox"/> CONCRETE <input type="checkbox"/> STEEL <input type="checkbox"/> OTHER _____
GROUT MATERIAL USED		HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE?		NUMBER OF BAGS OF GROUT USED
POUNDS OF GROUT PER BAG				

TYPE OF FILL MATERIAL USED	AMOUNT OF FILL MATERIAL USED	CIRCLE ONE	DEPTH TO TOP OF FILL MATERIAL FROM THE SURFACE
<input type="checkbox"/> GRAVEL <input type="checkbox"/> AG-LIME <input type="checkbox"/> SAND <input type="checkbox"/> OTHER _____		CU. YDS./TONS	
MULTIPLE WELLS	WELL CHLORINATED BEFORE PLUGGING?	AMOUNT USED FOR THE CHLORINATION	DATE WELL WAS PLUGGED
<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	_____ GALLONS OF CHLORINE _____ POUNDS OF CHLORINE _____ TABLETS OF CHLORINE	
WAS THE WELL ABANDONED BECAUSE OF HOOKING UP TO A PUBLIC OR RURAL WATER SUPPLY DISTRICT? <input type="checkbox"/> YES <input type="checkbox"/> NO		REASON WELL WAS PLUGGED	
IF YES, WHAT IS THE NAME OF THE WATER DISTRICT:			

REMARKS

I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER	SIGNATURE (CONTRACTOR)	PERMIT NUMBER	DATE
X		X		

MO 780-1803 (11-02)
 DISTRIBUTION: WHITE/DIVISION CANARY/CONTRACTOR PINK/OWNER
 MAIL WHITE COPY TO: DEPARTMENT OF NATURAL RESOURCES, P.O. BOX 250, ROLLA, MO 65402
 ENCLOSE NO FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL COMPLETION