18 AAC 80.015. Well protection, source water protection, and well decommissioning.

(d) A person who owns or is responsible for a well, hole, or excavation into a water supply source or potential water supply source for a public water system shall use a method described in (b) of this section to seal, protect, or fill

(1) a well that is abandoned or not in use;

(2) a hole drilled, augered, or jetted for the purpose of subsurface exploration or sampling;

(3) a cathodic protection well; or

(4) another form of excavation that might contaminate a public water system.

(e) A person who decommissions a public water supply well, an observation well associated with testing a public water system supply well, a private water well, or a monitoring well shall use

(1) a method that conforms to ANSI/AWWA Standard A100-97, Appendix H, adopted by reference in 18 AAC 80.010(b); or

(2) an alternate method that has been presented to and approved by the department as protective of public health; the department will, as the department considers necessary to serve the interest of public health, require that an alternative plan submitted under this paragraph be signed and sealed by a registered engineer. (Eff. 10/1/99, Register 151)

Authority:	AS 46.03.020	AS 46.03.070	AS 46.03.720
	AS 46.03.050	AS 46.03.710	

Editor's note: In addition to the requirements in (b) of this section, requirements of the Department of Natural Resources at 11 AAC 93 might apply.

Information about how to review or obtain the materials referred to in 18 AAC 80.015 is in the editor's note to 18 AAC 80.010.

APPENDIX H

Decommissioning of Test Holes, Partially Completed Wells, and Abandoned Completed Wells

This appendix is for information only and is not a part of AWWA A100.

SECTION H.1: GENERAL

The recommendations contained in this appendix pertain to wells and test holes in consolidated and unconsolidated formations. Each sealing job should be considered as individual in nature, and methods and materials should be determined only after carefully considering the objectives outlined in the standard.

SECTION H.2: WELLS IN UNCONSOLIDATED FORMATIONS

Normally, test holes, partially completed wells, and abandoned completed wells extending only into consolidated formations near the surface and containing water under water-table conditions can be adequately sealed by filling with concrete, grout, bentonite, or sealing clay. In the event that the water-bearing formation consists of coarse gravel and producing wells are located nearby, care must be taken to select sealing materials that will not affect the producing wells. Concrete may be used if the producing wells can be shut down for a sufficient time to allow the concrete to set without the cement washing out. Clean, disinfected sand or gravel may also be used as fill material opposite the water-bearing formation. The remainder of the well, especially the upper portion, should be filled with concrete, cement grout, bentonite, or sealing clay to exclude surface water. The latter method, using clay as the upper sealing material, is especially applicable to large-diameter abandoned wells.

In gravel-packed, gravel-envelope, or other wells in which coarse material has been added around the inner casing to within 20 ft to 30 ft (6.1 m to 9.1 m) of the surface, the sealing outside the casing is very important. Sometimes this sealing may require removal of the gravel or perforation of the casing, to ensure that the well or hole is sealed to a minimum depth of 50 ft (15.2 m) from the surface.

SECTION H.3: WELLS IN CREVICED FORMATIONS

Test holes, partially completed wells, and abandoned completed wells that penetrate limestone or other creviced or channelized rock formations lying immediately below the surface deposits should preferably be filled with concrete or grout, to ensure permanence of the seal. The use of clay or sand in such wells is not desirable because fine-grained fill material may be displaced by the flow of water through

crevices or channels. If limited vertical movement of water in the formation will not affect the quality or quantity of water in nearby producing wells, alternate layers of coarse stone and concrete may be used for fill material through the water-producing horizon. Otherwise only concrete or grout should be used. The portion of the well between a point 10 ft to 20 ft (3.0 m to 6.1 m) below and a point 10 ft to 20 ft (3.0 m to 6.1 m) above the creviced formation should be sealed. Clay or sand may be used to fill the upper part of the well to within 50 ft (15.2 m) of ground level. The upper 50 ft (15.2 m) should be sealed with concrete, grout, bentonite, or sealing clay.

SECTION H.4: WELLS IN NONCREVICED ROCK FORMATIONS

Test holes, partially completed wells, and abandoned completed wells encountering noncreviced sandstone or other water-bearing consolidated formations below the surface deposits may be satisfactorily sealed by filling the entire depth with clay, provided there is no movement of water in the well. Disinfected clean sand may also be used through the sandstone up to a point 10 ft to 20 ft (3.0 m to 6.1 m) below the bottom of the casing. The upper portion of this type of well should be filled with concrete, grout, bentonite, or sealing clay to provide an effective seal against entrance of surface water. If there is an appreciable amount of upward flow, pressure grouting or pumping of concrete is advisable.

SECTION H.5: MULTIPLE AQUIFER WELLS

Some special problems may develop in sealing wells extending into more than one aquifer. These wells should be filled and sealed in such a way that the comingling of water from one aquifer to another is prevented. If no appreciable movement of water is encountered, filling with concrete, grout, or alternate layers of these materials and sand will prove satisfactory. When velocities are high, the procedures outlined in Sec. H.6 are recommended. If alternate concrete plugs or bridges are used, they should be placed in known nonproducing horizons or, if locations of the nonproducing horizons are not known, at frequent intervals. Sometimes when the casing is not grouted or the formation is noncaving, it may be necessary to break, slit, or perforate the casing to fill any annular space on the outside.

SECTION H.6: WELLS WITH ARTESIAN FLOW

The sealing of test holes, partially completed wells, and abandoned completed wells that have water moving between aquifers or to the surface requires special attention. Frequently, the movement of water may be sufficient to make sealing by gravity placement of concrete, grout, bentonite, or sealing clay impractical. In such wells, large stone aggregate (not more than one third of the diameter of the hole) or a well packer will be needed to restrict the flow and thereby permit the gravity placement of sealing material above the formation producing the flow. If preshaped

or precast plugs are used, they should be several times longer than the diameter of the well to prevent tilting.

Because it is very important in wells of this type to prevent circulation between formations or loss of water to the surface or to the annular space outside the casing, it is recommended that pressure grouting or pumping of concrete, using the minimum quantity of water that will permit handling, be used.

In wells in which the hydrostatic head producing flow to the surface is low, the movement of water may be arrested by extending the well casing to an elevation above the artesian-pressure surface. Previously described sealing methods suitable to the geologic conditions can then be used.

SECTION H.7: SEALING MATERIALS

A number of materials can be used for sealing wells satisfactorily. They include concrete, grout, bentonite, sealing clay, sand, or combinations of these materials, and are mentioned in this appendix. Each material has certain characteristics and distinctive properties; therefore, one material may be especially suited for doing a particular job. The selection of the material must be based on the construction of the well, the nature of the formations penetrated, the material and equipment available, the location of the well with respect to possible sources of contamination, the pH of the water and its affect on the sealing material, and the cost of doing the work.

Generally, concrete is used for filling the upper part of the well or water-bearing formations, for plugging short sections of casings, or for filling large-diameter wells. It may be cheaper to use than grout and it makes a stronger plug or seal. However, concrete will not penetrate thin seams, crevices, or interstices. Furthermore, proper care must be taken during the placement of concrete to ensure that the aggregate does not separate from the cement.

Grout is far superior for sealing small openings, for penetrating any annular space outside of casings, and for filling voids in the surrounding formation. When applied under pressure, it is strongly favored for sealing wells under artesian pressure or for wells that penetrate more than one aquifer.

Clay, as a heavy mud-laden or special clay fluid applied under pressure, has most of the advantages of grout. Its use is preferred by some competent authorities, particularly for sealing artesian wells. Others feel that it may, under some conditions, eventually be carried away into the surrounding formations.

Clay in a relatively dry state, clay and sand, or sand alone may be used advantageously as sealing materials, particularly under water-table conditions where diameters are large, depths are great, formations are caving, and where there is no need to penetrate openings in casings, liners, or formations, or to obtain a watertight seal at any given spot.

Frequently, combinations of these materials are necessary. The more expensive materials are used when strength, penetration, or watertightness are needed. The less expensive materials are used for the remainder of the well. Grout is now being mixed with bentonite clays and various aggregates to achieve superior results and lower costs.