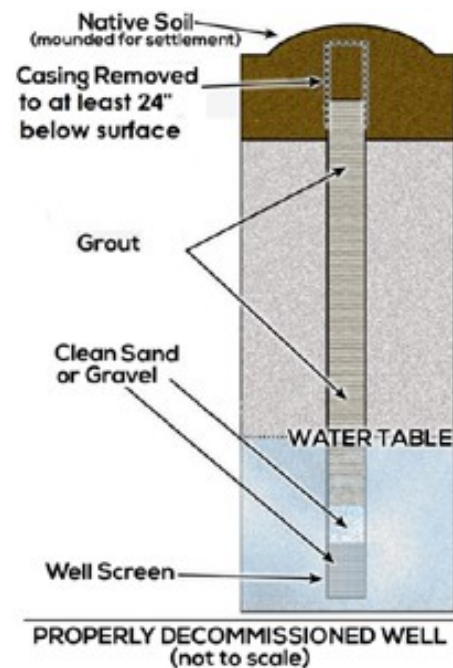




## NYSDEC DIVISION OF WATER WATER SUPPLY WELL DECOMMISSIONING RECOMMENDATIONS

**Note: For decommissioning procedures associated with environmental remediation projects, please see NYSDEC Division of Environmental Remediation's Groundwater Monitoring Well Decommissioning Policy.**

To prevent groundwater contamination and hazardous ground conditions, all wells must be either maintained or properly decommissioned. Good maintenance includes protection from vandalism by use of a protective casing and a locked well cap in good condition or by welding the cover in place. Additionally, the well casing should be maintained in a way to prevent surface water from entering the casing. The casing or cap should be marked with a well owner's identification and the well owner should keep a record of all well locations. Maintenance also includes inspecting the well periodically, at least once per year. If for any reason the well is not maintained it should be decommissioned. The term "abandonment" is vague and could be defined simply as neglect. Therefore, think of decommissioning a well to be permanent closure.



The following procedure will ensure proper decommissioning of a well.

### I. Local and regional regulations

Prior to conducting well decommissioning, municipal authorities should be contacted to determine if there are local regulations regarding this activity. In Nassau, Suffolk, Kings, and Queens counties, the NYSDEC Region 1 office must be contacted prior to any well decommissioning.

### II. Written records

Complete and accurate written records of decommissioning operations should be maintained. The information to be recorded should include the original well log and/or

construction record, the type of grouting material used, volume of material used, and method of placing grouting material into the well. Upon decommissioning a well, a Water Well Abandonment and Decommissioning Report should be submitted to DEC. Records of wells decommissioned in Nassau, Suffolk, Kings, and Queens counties must be sent to NYSDEC's Region 1 office.

### **III. Removal of obstructions**

Remove equipment, materials, debris, and obstructions that may interfere with sealing of the well or boring. This may include pumping equipment, drop pipe, packers, etc.

### **IV. Disinfection**

The well should be disinfected using a solution of calcium hypochlorite, such as HTH, containing approximately 65% to 75% available chlorine. Common household bleach may be too weak. Calcium hypochlorite products containing fungicides, algicides, or other disinfectants should be avoided.

### **V. Casing**

Appropriate measurements should be made to verify the depth of the well. Casing with an open annular space should be either grouted in place or removed. For casing removed from a collapsing formation, grout should be pumped through a tremie pipe so that during its removal the bottom of the casing remains submerged in grout.

A. Where casing is grouted in place, the casing should be cut off at least 24 inches below grade, where practicable. For wells located in a building, upon completion of grouting the casing should be filled to floor level with no less than 12 inches of cement. Casing should be cut off not more than 3 inches from floor level. For wells terminating in a well pit, casing should be cut off not less than twelve inches below the grade established when the pit is filled.

### **VI. Screened intervals**

The portion(s) of the well occupied by the well screen should be filled with clean sand or gravel (defined as being relatively free of clay and organic matter). The filling should be no less permeable than the formation surrounding the well screen and should extend no more than three feet above the top of the screen.

### **VII. Grouting of the well**

The entire casing, including the riser and annular spaces between casings should be filled. Sealing materials should have bearing strength sufficient to prevent subsidence and support traffic or building loads. Note that the use of too much bentonite in the grout mix can lead to excessive shrinkage and cracking.

A. Slurry mixture and pumping - When a bentonite slurry, neat cement slurry or concrete slurry is used, it should be placed into the well under pressure via a tremie pipe of at least one inch inside diameter. At the start of operations, the tremie pipe is placed at the bottom of the well to avoid segregation or dilution of sealing materials. The tremie pipe should be submerged in the slurry at all times during slurry placement. The tremie pipe may be raised slowly as grout is introduced to the casing or hole. Placing of grout should be continuous until grout appears at the top of the casing, at which time the tremie pipe may be removed. If the tremie pipe remains at the bottom of the well during grout emplacement, remove the pipe prior to grout hardening.

B. Cement slurries - Neat cement or concrete slurries should be prepared by adding cement or sand-and-cement to the calculated required volume of clean water. The material should be adequately mixed until it is free of lumps, then immediately pumped into the well without delay.

C. Coarse grade or pelletized bentonite - Where coarse grade or pelletized bentonite is used, it should be poured slowly into the top of the well to avoid bridging of material in the casing or borehole. Pellets or coarse bentonite should be placed into the well by pouring at an even rate not to exceed fifty pounds per five-minute interval. Fine bentonite particles which accumulate in the bottom of the shipping container should not be used. A work pipe or weighted drop string should be placed in the well and the height of accumulated plugging material measured after each 50 pounds of bentonite is placed in the well. If measurement indicates that bridging of plugging material has occurred, a work pipe, drill rods, or other weighted device should be run into the casing to break the bridge. The plugging operation should continue until the bentonite appears at the surface. Water should then be placed into the casing to promote expansion of the bentonite above the static water level.

D. Additional sealing recommendations for wells or borings in unconsolidated materials:

1. It is recommended that the portion of a well adjacent to unconsolidated material be filled with bentonite grout, high solids bentonite grout, or neat cement grout. Concrete grout is most appropriate for grouting in the dry portion of the hole.

2. A dug well 16 inches or greater in diameter may be sealed by pouring at a rate sufficient to completely fill the well without bridging using:

- a. uniformly mixed dry bentonite powder or granular bentonite and sand in a ratio of one part bentonite to five parts sand;

- b. clean unconsolidated materials with a permeability of 10-6

centimeters per second or less; or  
c. concrete grout.

E. Additional sealing recommendations for wells or borings in rock:

1. Lost circulation can occur when sealing a bedrock well that intersects fractures. Care must be taken to bridge or seal fractures to prevent excessive loss of grout and ensure that the fracture is sealed. Application of lost circulation prevention methods may be required. Any materials added to a cement or bentonite slurry for this purpose must not pose a contamination risk to groundwater. Wells penetrating cavernous rock may require placement of a bridge in competent rock over the void. Grout is then placed above the bridge.

**VIII. Sealing flowing wells**

For flowing wells the integrity of the exterior casing seal should be tested prior to decommissioning the well. To test the seal, the well should be capped for a period of one week and checked for any leakage around the outside of the casing. If leakage occurs, the casing exterior must be resealed prior to well decommissioning. Once leakage has been eliminated, the interior of the well casing should be pressure grouted. The Department should be notified when a well cannot be sealed as described. Alternately, and depending on the pressure head, the casing can be extended upward until no water flows over the top. For more information on sealing flowing wells, see the Michigan Department of Environmental Quality Flowing Well Handbook.

**IX. Site restoration**

Well pits should be filled with clean soil to the established grade level. Upon completion of well decommissioning, the site should be restored to a condition that reasonably approaches the original condition of the property prior to the start of work. The work area should be graded to conform to existing ground contours. All materials, debris, tools, machinery, sealing material, grease, or other materials which have accumulated at the site should be removed and/or disposed of properly and in accordance with law.

NOTE: When an active well becomes inactive, please fill out NYSDEC's Well Abandonment and Decommissioning Report.