



STANDARD OPERATING PROCEDURE TO ABANDON WATER WELLS AND PIEZOMETERS



15 September 2010

4 November 2014

3 April 2015

This Standard Operating Procedure provides guidance for abandoning water wells (including relief wells, production wells, monitoring wells, observation wells and piezometers) that are located within the right-of-way of federal levees. Abandoning of these components requires a USACE Levee System Modification Permit (Form CELRL-803) and appropriate project plans and specifications are submitted with the permit application. In addition to these requirements, well abandonment must be performed in accordance with all Federal, State, and Local regulations.

Three methods are available for abandonment. Method 1 is preferred and must be used unless a demonstration is made that it is not feasible in a specific situation. In that case, Method 2 may be used with approval of the Louisville Engineer District Levee Safety Officer (LSO). Special circumstances may require development of a site-specific abandonment procedure (Method 3).

A **Permit** or Letter of No Objection is required for well abandonment.

Method 1: Overdrill and Backfill

The preferred protocol for abandonment is to overdrill the well with drilling tools that are larger diameter than the original bore hole, and then grout the resulting borehole. This method requires the removal of the well casing and screen; if this is not possible, then Method 2 must be utilized. Overdrilling shall reach a depth of at least two ft below the depth of the original borehole. Backfill material shall consist of grout and fill from the bottom of the overdrilled borehole to two feet below the ground surface. The remainder of the borehole is then filled to the ground surface with compacted soil similar to the surrounding soil. Measures must be taken to ensure that the borehole does not collapse prior to grout placement.

Method 2: Backfill

The alternative method for well abandonment (not preferred) is to place backfill material consisting of grout in the well casing to a depth of three feet below the ground surface. The casing is then cut off three feet below the ground surface and a twelve-inch thick Portland cement concrete plug is placed over the cut off casing. The excavation is then filled the rest of the way to the ground surface with compacted soil similar to the surrounding soil. The backfill material are to reflect the characteristics – strength and permeability of the surrounding ground. Please consult USACE Louisville District Levee Safety Area Representative for direction.

Method 3: Special Procedures

In the event that site-specific circumstances preclude the use of Methods 1 or 2, an alternative abandonment plan may be submitted to the USACE Louisville District LSO for consideration and approval. The plan must provide a level of sealing consistent with Methods 1 or 2.

Backfill Materials

Backfill materials shall consist of either bentonite grout or cement-bentonite grout. Bentonite grout shall consist of high-solids bentonite mixed with water in accordance with the manufacturer's recommendations. Cement-bentonite grout shall consist of a mixture of portland cement with 3-5% bentonite added, mixed with no more than six gallons of water per 94 pounds of portland cement.

Backfill Placement

Backfill shall be placed by pumping through a tremmie pipe. The tremmie pipe shall extend to the bottom of the borehole (Method 1) or well casing (Method 2) and the grouting shall proceed from the bottom upward as the tremmie pipe is withdrawn.

Documentation

Well abandonment documentation shall be submitted to the Louisville Engineer District LSO upon completion of the abandonment. That documentation shall include the well identification, location coordinates (reference SOP for *Documentation of Levee System Feature Locations in the field*, dated April 2015, method used for abandonment, details of the abandonment (well depth, overdrill depth, overdrill auger diameter, quantity of grout used, etc.), photos during and at the end of the work, and a map showing the well location.