

## **BORINGS, POSTS AND POWER POLES**

### **Revised Oct. 98**

1. Post and power pole installation. The following requirements for the installation of post/power poles should be addressed:
  - 1.1. The borings for the poles should provide a minimum diameter equal to the diameter of the pole plus an annular space equal to two widths of the tamper with the pole centered in the boring
  - 1.2. Holes should be backfilled from the bottom to within 5 feet of the existing ground surface by placing material in 4 inch thick layers. Each layer should be mechanically tamped with not less than 2 tamps per layer prior to placement of a successive layer. Each layer should be compacted to a density approximately equal to or greater than the surrounding undisturbed soil. The moisture content of the backfill material may need to be adjusted either by moistening or aerating as required to facilitate compaction.
  - 1.3. At ground surface the backfill should be mounded up immediately adjacent to the pole to direct the water away from the pole.
  - 1.4. The upper 5 feet of the hole should be backfilled with a "Cement Bentonite Grout Slurry" to the surrounding ground surface. The slurry should be proportioned as a 94 pound sack of Type I Portland cement with 5 pounds of powdered bentonite and 8 1/2 gallons of water. The upper 2 feet can be compacted soil in agricultural lands.
  - 1.5. All areas disturbed due to pole installation should be graded to drain. Disturbed areas should be seeded and mulched to match existing varieties of slope protection grass.
  - 1.6. The holes should be kept dry during backfilling procedures.
2. Exploratory borings, dewatering wells, piezometers and other holes. The exploratory borings, existing wells, piezometers and other holes drilled in the critical area should comply with the following requirements:
  - 2.1. Drilling should be discontinued and grout or bentonite seals should be placed in all open borings if the river is approaching flood stage. Drilling should not start if the river is approaching flood stage. A contingency plan should be submitted for review if the borings are done during a flood period. The contingency plan should meet the requirements listed in the topic **TEMPORARY FLOOD CONTROL AND CONTINGENCY PLAN**.
  - 2.2. Boreholes should not be left unattended for over 24 hours. All open borings should be sealed before leaving the site at the end of a work week.

2.3. Borehole sealing materials and equipment should be on hand at the site before drilling begins in the event that unexpected river stage increases occur.

2.4. Abandonment of piezometers or wells (relief, water or dewatering wells) should follow applicable state regulations. These generally provide the most current acceptable methods and should be referred to prior to abandoning any well, test hole, piezometer, or other device. In some instances, the state regulations may not specifically govern some of these features, however the procedures outlined in the regulation should be used as a guide to properly abandoning wells, instruments, and test holes. In addition, many pressure relief well systems and construction dewatering well systems have unique construction features that require specific design consideration to safely and acceptably abandon. The levee sponsor should seek the advice of a registered geologist or professional engineer regarding abandonment of wells that are components of systems with complex design features such as underground vaults, buried collector systems, etc. The following guidance therefore is intended for application only to abandonment of wells with basic design and construction features.

2.4.1. In general, all wells, test holes, and piezometers in Kansas are regulated by the Kansas Department of Health and Environment (KDHE). KDHE Article 12, “Groundwater Exploration and Protection Act”, and the KDHE “Plugging Packet” prescribe how various types of wells, test holes, and piezometers are to be abandoned. However, because many pressure relief well systems include buried collector systems and/or underground vaults, the KDHE and the COE should be contacted to discuss pertinent design features to ensure safe and acceptable well abandonment, and maintain integrity of the flood control features. The selected abandonment method should be reviewed by the COE and approved by the levee sponsor based on COE recommendations.

2.4.2. Currently, pressure relief wells and construction-dewatering wells are exempt from state regulation in Missouri. However, Missouri Department of Natural Resources (MDNR) does govern the abandonment of test holes and piezometers in Missouri (Missouri Well Construction Rules, Miscellaneous Publication No. 50). Where state regulations do not apply, the following guidance should be used as a minimum to abandon obsolete and defective wells OR piezometers. Tremie placement of cement or cement-bentonite grout from the bottom of the well to the ground surface is the preferred method of abandonment for smaller diameter wells and devices. Alternatively, if well diameter and depth make full-length placement of grout economically infeasible, chlorine disinfected granular material may be placed by tremie pipe from the bottom of well to 50 feet below ground surface. Cement or cement-bentonite grout should then be placed by tremie pipe from the top of granular material (50’ below ground surface) to 3 feet below ground surface. All surface features should be removed and the remaining open hole should be backfilled with compacted clay soil. However, because many well systems include buried collector systems and/or underground vaults, the MDNR and the COE should be contacted to discuss pertinent design features to ensure safe and acceptable well abandonment. The selected abandonment method should be reviewed by the COE and approved by the levee sponsor based on COE recommendations.

2.4.3. The goal of any well, device, or test hole abandonment is to plug the opening to prevent uncontrolled flows from compromising the integrity of the flood control structure, and to prevent the migration of contaminants into the groundwater. A registered geologist or professional engineer should design any abandonment operation involving design features other than the most basic well construction or test holes. Prior to beginning work, the selected abandonment method should be reviewed by the COE and approved by the levee sponsor based on COE recommendations. Refer to ASTM D5299-92, “Standard Guide for Decommissioning Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities” for additional guidance on abandonment procedures.

2.4.4. Abandonment of exploratory borings should be done by backfilling the boring with sand to the base of the impervious blanket and with slurry cement grout within the impervious blanket. The top 2 feet should be backfilled with compacted impervious material.