for capacity loss. Perform corrective measures, including redesign of footings caused by defective shafts, at no increase in contract price or contract time. The Engineer will not pay for defective casing remaining in place.

(c) Permanent Casing. Ensure casing is continuous between top and bottom casing elevations. After completing installation, cut off permanent casing at prescribed elevation. Complete shaft by installing required reinforcing steel and concrete in casing.

When special temporary casings are in the contract documents or specified in writing by the Engineer, maintain temporary outer casing alignment with permanent inner casing. Provide watertight seal between the two casings during excavation and concreting operations.

(5) Slurry. Drilling slurry will not be allowed.

(6) Excavation Inspection. Provide equipment for checking dimensions and alignment of each permanent shaft excavation. After cleaning, measure final shaft depth with weighted tape.

Ensure a minimum of 50 percent of each shaft base has less than 1/2 inch of sediment at the time concrete is placed. Ensure maximum sediment depth or debris on shaft base does not exceed 1-1/2 inches. The Engineer will visually inspect dry shafts for cleanliness. For wet shafts, the Engineer will use inspection methods deemed appropriate.

(7) Reinforcing Steel Cage Construction and Placement. Assemble and place reinforcing steel cage immediately after the Engineer inspects and accepts shaft excavation and before placing concrete. Reinforcing steel cage includes longitudinal bars, ties, cage stiffener bars, spacers, centralizers, and other appurtenances necessary to complete cage.

Tie and support shaft reinforcing steel such that reinforcing steel placement conforms to allowable tolerances as specified in Subsection 511.03(C)(10) – Construction Tolerances. Use concrete spacers at sufficient intervals (near bottom and at intervals not exceeding 10 feet along shaft length) to ensure concentric spacing for entire cage length. Use minimum of four spacers, equally spaced around circumference, at each vertical interval. Construct spacers of material accepted by the Engineer, equal in quality and durability to concrete specified for the shaft. Furnish spacers of adequate dimension to ensure a minimum 3-inch space between outer portion of reinforcing cage and side of excavated hole or casing. Provide