With the explosion of the industrial mining operations in the state, there is an increased amount of soils exploration drilling occurring to identify sand deposits. It is important that those involved in these drilling operations are aware of State Law which requires that all boreholes / drillholes which exceed 10 feet in depth or intersect water must be properly abandoned according to the requirements in ch. NR 812, Wisconsin Administrative Code. Leaving holes open can create a direct conduit for entry of contaminants to waters of the state and is a violation of ch. 281, Wisconsin Statutes and ch. NR812, Wis. Adm. Code.

The Departments authority for requiring the abandonment of exploratory boreholes is found in s. NR 812.02(2), Wis. Adm. Code which states “For the purposes of abandonment, the provisions of this chapter apply to all drillholes and wells including, but not limited to, mining exploration drillholes not regulated by ch. NR 132, wells and drillholes not regulated by s. NR 141.25 and elevator shaft drillholes.

- s. NR 812.07(33), Wis. Adm. Code defines drillhole as “an excavation, opening or driven point well deeper than it is wide that extends more than 10 feet below the ground surface.” Drillholes are also referred to as “boreholes” which are defined in s. NR 141.05(9) as “a circular hole deeper than it is wide, constructed in earth material for the purpose of either installing a well or obtaining geologic or groundwater related data.”

- s. NR 812.26(7), Wis. Adm. Code addresses permanent abandonment methods and materials. It states:
  (a) Methods. Once obstructions have been removed from a well or a drillhole, it shall be permanently abandoned by filling, from the bottom up, with the materials specified in this paragraph and Table C with the use of a conductor (tremie) pipe, except where the use of a conductor pipe is specifically exempted, by using one or the following methods:
  1. ‘Wells and drillholes completed in unconsolidated formations’.
     a. Drilled wells and drillholes or driven-point wells 2-1/2 inches or larger in diameter in unconsolidated formations shall be filled with neat cement grout, concrete (sand-cement) grout, concrete, or with clay or a sodium bentonite-water-sand slurry with a mud weight of at least 11 pounds per gallon or as in subd.3. When clay or sodium bentonite-water-sand slurry is used, the slurry shall have a sand content of at least 10%, but not more than 25% by volume of the slurry and at least the top 5 feet shall be filled with neat cement grout, concrete (sand-cement) grout, concrete or approved chipped bentonite.
     b. Driven-point wells and drillholes less than or equal to 2-1/2 inches in diameter completed in unconsolidated formations shall be filled with neat cement grout which may be poured or pumped down the drive pipe or drillhole. The use of a conductor pipe is not required. The drive pipe and screen may be removed before placement of the grout if the total well depth is 25 feet or less.
  2. ‘Filling wells and drillholes’. Wells and drillholes completed in bedrock formations shall be completely filled from the bottom up with neat cement grout, concrete grout, concrete or approved bentonite chips as provided in subd. 3. As an alternative for uncontaminated bedrock wells and drillholes deeper than 250 feet, chlorinated, sand-free pea gravel may be used to fill the well or drillhole from the bottom up to the 250-foot depth provided that for wells or drillholes extending through more than one geologic formation, a neat cement grout, concrete or bentonite chip plug at least 40 feet thick is placed at the contact surface between the adjacent geologic formations. When
pea gravel is used for this alternative, it may be poured without the use of a conductor pipe provided the well is sounded at 50-foot intervals to ensure that bridging of the gravel in the well does not occur.

3. ‘Use of bentonite chips’. Approved slow-hydrating bentonite chips may be used to fill both unconsolidated formation and bedrock wells and drillholes by using instructions provided by the department with the following restrictions:
   a. For wells and drillholes 4-inch diameter and larger the total depth may not be deeper than 500 feet and the number of feet of standing water in the well or drillhole may not be more than 350 feet. As an alternative for uncontaminated wells and drillholes deeper than 250 feet, chlorinated, sand-free pea gravel may be used to fill the well or drillhole from the bottom up to the 250-foot depth provided that for wells or drillholes extending through more than one geologic formation, a bentonite chip plug at least 40 feet thick is placed at the contact surfaces between the adjacent geologic formations. When pea gravel is used for this alternative, it may be poured without the use of a conductor pipe provided the well is sounded at 50-foot intervals to ensure that bridging of the gravel in the well does not occur.
   b. Not allowed for wells and drillholes less than 4-inch diameter, and
   c. Not allowed for any well or drillhole filled with drilling mud or bentonite slurry.

- s. NR 812.26(7)(b), Wis. Adm. Code provides a listing of the materials that can be used for well abandonment.
  - (b)Materials.
    1. Neat cement grout, concrete (sand-cement) grout, clay slurry or sodium bentonite slurry as described in s. NR 812.20(1) or approved chipped bentonite shall be used to permanently abandon wells and drillholes where the use of such materials are required in this section. Powdered bentonite may be added to neat cement grout up to a ratio of 5 pounds of bentonite per 94-pound bag of cement.
    2. Concrete shall consist of a mixture of cement, water, sand and gravel in the proportion of one bag Portland cement (94 pounds) (ASTM C 150, Type I or API-10A, Class A), or an equal measure of sand and an equal measure of gravel, by weight or by volume, and not more than 6 gallons of water. As an alternative, a commercially prepared mix may be used providing the mix has a least 6 bags of cement per cubic yard. The gravel size may not exceed 1/3 of the inside diameter of the conductor (tremie) pipe used for the well abandonment.

- s. NR 812.26(8), Wis. Adm. Code requires the submittal of abandonment reports. It states “An abandonment report shall be filed with the department within 30 days after the well or drillhole is abandoned. The abandonment report shall be filed by the person performing the abandonment on forms provided by the department and shall include a complete detailed description of locations of the well, method of sealing, construction and geologic features, if known. Well drillers, well constructors and pump installers shall report to the department any unused or unabandoned wells or drillholes of which they have knowledge.

The Department encourages that boreholes drilled for the purpose of soils exploration be abandoned immediately as the hole is completed in order to avoid the potential for soils collapse and bridging to occur in the hole. A copy of the applicable section(s) of NR. 812, Wis. Adm. Code and the forms are attached for reference. Upon completion, Form 3300-005 must be submitted to the Department. Please mail forms to WDNR, Bureau of Drinking Water and Groundwater, P.O. Box 7921, Madison, WI 53707-7921.

Please keep in mind that failure to properly abandon a borehole can result in liability for contamination of waters of the state.