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TITLE 312 NATURAL RESOURCES COMMISSION

Proposed Rule
LSA Document #05-341

DIGEST

Amends 312 IAC 13-8-1, 312 IAC 13-8-3, and 312 IAC 13-10-2, governing water well drilling contractors, to apply new grouting requirements to geothermal heat pump wells, replace numerical diameter requirements for a monitoring well by a functionality requirement, modify the standards for a filter pack seal in a monitoring well, establish standards for a monitoring well constructed by the direct push method, and, for a cover on a bucket well or a hand dug well that was abandoned before January 1, 1988, no longer authorize lumber if treated with chromium copper arsenic salt. Makes other technical changes. Effective 30 days after filing with the Secretary of State.

IC 4-22-2.1-5 Statement Concerning Rules Affecting Small Businesses

The Natural Resources Commission is authorized to adopt the proposed amendments under IC 25-39-4. The Department of Natural Resources estimates approximately 25 small business will be directly affected by the proposed rule changes. The changes will have no adverse annual impact on small businesses. Approximately 1,100 monitoring wells are reportedly installed annually in Indiana. The most notable consequence of the changes is that they would allow monitoring wells to be installed more efficiently and at a lower cost with the potential for increasing revenue for these small businesses. Also, the amendments do not impose an additional requirement or cost under IC 4-22-2-24(d). Persons who require the installation of monitoring wells may receive a cost saving.

312 IAC 13-8-1
312 IAC 13-8-3
312 IAC 13-10-2

SECTION 1. 312 IAC 13-8-1 IS AMENDED TO READ AS FOLLOWS:

312 IAC 13-8-1 Geothermal heat pump wells
Authority: IC 25-39-4-2; IC 25-39-4-9
Affected: IC 25-39

Sec. 1. (a) This section establishes standards for drilling ground water heat pump systems that are in addition to the general requirements for drilling a well under 312 IAC 12.

(b) If a return well is used with an open loop system, its design shall provide a water transmitting capacity that is at least one and one-half (1½) times the required water supply of the heat pump unit.

(c) With respect to a vertical closed loop system, boreholes shall be pressure grouted from the bottom of the borehole to the ground surface **with a high solids bentonite grout that may contain sand to enhance thermal conductivity.** *(Natural Resources Commission; 312 IAC 13-8-1; filed Nov 22, 1999, 3:34 p.m.: 23 IR 770; readopted filed Aug 4, 2005, 6:00 p.m.: 28 IR 3661)*

SECTION 2. 312 IAC 13-8-3 IS AMENDED TO READ AS FOLLOWS:

312 IAC 13-8-3 Monitoring wells
Authority: IC 25-39-4-2; IC 25-39-4-9
Affected: IC 25-39

Sec. 3. (a) This section establishes standards for monitoring wells that are in addition to the general requirements for drilling a well under this article.

(b) A monitoring well shall be equipped with casing. ~~having a~~ **The composition, wall thickness, and** nominal diameter of ~~at least:~~
~~(1) three-fourths (¾) of an inch if~~ the ~~well is installed for the primary purpose of monitoring ground water levels; or~~
~~(2) two (2) inches if~~ **casing shall be sufficient to allow** the well ~~is installed~~ **to be used** for ~~the primary~~ **its intended** purpose. ~~of monitoring the quality of ground water.~~

(c) Monitoring well casing shall be new first class material that meets the American Society of Testing Materials (ASTM) standards ASTM A-120 (1984) or ASTM A-53 (1987) or the American Petroleum Institute (API) standards API-5A or API-5L (1987). Thermoplastic pipe shall comply with ASTM F-480 (1981). Well casing shall be as follows:
(1) Clean and free of rust, grease, oil, or contaminants and composed of materials that will have minimal impact on the quality of a water sample.
(2) Centered in the borehole and free of obstructions so ~~that~~ monitoring devices can be lowered into the well.

(d) A monitoring well screen shall be composed of materials that will not corrode or react with chemicals found in the ground water at the site. The well screen slots shall not be hand cut and shall be sized to retain at least ninety percent (90%) of the grain size of the introduced filter pack or natural formation materials if an introduced filter pack is not used. The introduced filter pack shall:
(1) be properly sized and graded; and ~~shall~~
(2) not extend more than two (2) feet above the top of the screen or the uppermost water bearing unit to be monitored in the well annulus unless otherwise approved by the division.

(e) A filter pack seal of **bentonite slurry or granular,** pelletized, medium grade, or coarse grade crushed bentonite may be placed in the annulus directly above the filter pack **or sand grout barrier.** The filter pack seal shall:
(1) be installed ~~so~~ **to prevent** bridging; ~~is prevented,~~ and ~~the filter pack seal can~~
(2) not extend ~~no~~ more than two (2) feet above the filter pack **or sand grout barrier.**

(f) Except as provided in subsection (h), the finished well casing:
(1) shall extend at least two (2) feet above the ground level; and
(2) if located in a flood plain, must be:
(A) at least two (2) feet above the elevation of the regulatory flood; or ~~be~~
(B) equipped with a watertight cap.
The monitoring well shall be located to protect against surface water ponding, and earthen materials, neat cement, or concrete shall be placed around the well casing to drain surface water from the well.

(g) A monitoring well, located where the casing is susceptible to damage, shall be equipped with a protective outer pipe consisting of a metal casing having a diameter large enough to allow easy access to the well. The protective cover pipe shall be firmly anchored in the ground. Additional protective devices, for example, brightly colored posts around the well, are required where ~~the well could be damaged by~~ construction equipment or vehicular traffic **could damage the well.**

(h) A monitoring well must be equipped with a locking cap or cover to prevent unauthorized access. The locking cap may be placed:
(1) directly on the well casing; or
(2) if required under subsection (g), ~~placed~~ on the protective cover pipe.

(i) A monitoring well installed so that the top of the well casing is finished at an elevation below the ground surface shall be equipped with a watertight cap. The top of the well casing shall terminate at a depth no greater than one (1) foot below the ground surface and shall be located in a flush mounted protective cover pipe. The flush mounted protective cover pipe shall include each of the following:
(1) A watertight one (1) piece or continuous welded metal casing:
(A) at least one (1) foot long; and
(B) having a nominal diameter at least four (4) inches greater than the nominal diameter of the monitoring well.
The casing shall be flanged for greater stability if installed in a location likely to be subject to vehicular traffic.
(2) A concrete ground surface seal, if an impervious surface, for example, concrete or asphalt, is not present. The ground surface seal shall be installed and extend ~~no~~ **not** more than three (3) feet below the ground surface.
(3) A sealed lid ~~which~~ **that** is not more than one-half (½) inch higher than the elevation of the ground surface. The sealed lid shall be **as follows:**
(A) Of a quality to withstand vehicular traffic if installed in a location likely to be subject to vehicular traffic. ~~The lid shall be~~

(B) Clearly marked with the words "MONITORING WELL" or "MONITOR" and also display the words "DO NOT FILL".

(j) A monitoring well installed by the rotary or auger drilling method shall have a borehole with a diameter at least two (2) inches greater than the nominal diameter of the casing. Except as provided in subsection (e), the well shall be grouted as follows:

(1) Granular bentonite ~~can~~ **may** be used to grout a monitoring well if **the:**

(A) ~~the~~ diameter of the borehole is four (4) inches or larger than the nominal diameter of the well casing; and

(B) ~~the~~ well is not more than twenty-five (25) feet deep.

(2) Except as provided in subdivision (3), the annulus of the monitoring well shall be pressure grouted with neat cement or a bentonite slurry or be grouted with pelletized, medium grade, or coarse grade crushed bentonite from the top of the filter pack or filter pack seal under subsection (e) (for a well installed in unconsolidated materials) or the bottom of the well casing (for a well penetrating bedrock) to the ground surface or to within one (1) foot of the ground surface if a flush mounted protective cover pipe is installed if **the:**

(A) ~~the~~ diameter of the borehole is four (4) inches or larger than the nominal diameter of the well casing; and

(B) ~~the~~ well is not more than one hundred (100) feet deep.

(3) The annulus of the monitoring well shall be pressure grouted with neat cement or a bentonite slurry from the top of the filter pack or filter pack seal under subsection (e) (for a well installed in unconsolidated materials) or the bottom of the well casing (for a well penetrating bedrock) to the ground surface or to within one (1) foot of the ground surface if a flush mounted protected cover pipe is installed where either **the:**

(A) ~~the~~ diameter of the borehole is less than four (4) inches larger in diameter than the nominal diameter of the well casing; or

(B) ~~the~~ well is more than one hundred (100) feet deep.

(k) A monitoring well installed by the cable tool method shall be grouted as follows:

(1) The well casing shall be centered in a borehole:

(A) with a diameter of at least two (2) inches greater than the nominal diameter of the casing to be driven; ~~The borehole shall be~~

(B) dug at least three (3) feet, but ~~no~~ **not** more than five (5) feet, below the ground surface; and ~~shall be~~

(C) filled with granular bentonite or a bentonite slurry during the installation of the casing.

Notwithstanding 312 IAC 13-5-1(c), bentonite slurry may be introduced into the borehole annulus by gravity methods during the installation of the well casing.

(2) Grouting shall be performed as provided under subsection (i) if a larger diameter:

(A) temporary casing is used to install a smaller diameter permanent well casing; or

(B) borehole is drilled to install a smaller diameter well casing.

(l) A monitoring well installed by the direct push method must be constructed as follows:

(1) The well shall be equipped with a prepacked well screen.

(2) A sand grout barrier shall:

(A) be placed directly above the prepacked well screen in the annulus between the well casing (riser pipe) and the borehole wall as the probe rods are retracted;

(B) be installed to prevent bridging; and

(C) extend not more than two (2) feet above the top of the prepacked well screen.

(3) A filter pack seal may be installed under subsection (e) directly above the sand grout barrier.

(4) The remaining annulus between the well casing (riser pipe) and probe rods shall be pressure grouted with neat cement or a bentonite slurry from the top of the sand grout barrier or filter pack seal to:

(A) if a flush-mounted protective pipe is installed, within one (1) foot of the ground surface; or

(B) the ground surface.

(5) The probe rods shall be pulled during installation of the grout material.

~~(l)~~ **(m)** A monitoring well shall be developed following installation and before water samples are collected. This development shall be accomplished to produce water that is as free as practicable from **the following:**

(1) Sediment.

(2) Drill cuttings. ~~and~~

(3) Drilling fluids.

If a well is installed to monitor ground water quality, the well shall be adequately developed to present a representative sample of the water quality.

~~(m)~~ **(n)** Contaminated drill cuttings, fluids, and surge and wash waters produced in the drilling and development of a monitoring well shall be collected and contained to:

(1) prevent contamination of the area; and ~~to~~

(2) protect persons who might otherwise come in contact with these materials.

~~(n)~~ **(o)** Monitoring well construction and development equipment that comes in contact with contaminated water or contaminated geologic materials shall be cleaned with high-pressure hot water or steam, using inorganic soap or other suitable solvents, and rinsed thoroughly. Contaminated fluids or wash waters shall be collected and contained so that the result is not:

(1) contamination of the area; or

(2) a hazard to individuals who may come in contact with these materials.

(Natural Resources Commission; 312 IAC 13-8-3; filed Nov 22, 1999, 3:34 p.m.: 23 IR 770; errata filed Dec 30, 1999, 4:02 p.m.: 23 IR 1109; readopted filed Aug 4, 2005, 6:00 p.m.: 28 IR 3661)

SECTION 3. 312 IAC 13-10-2 IS AMENDED TO READ AS FOLLOWS:

312 IAC 13-10-2 Permanent abandonment of wells

Authority: IC 25-39-4-2; IC 25-39-4-6; IC 25-39-4-9

Affected: IC 25-39

Sec. 2. (a) A well abandoned before January 1, 1988, must be sealed at or above the ground surface by a welded, threaded, or mechanically attached watertight cap. The well shall be maintained so the well does not become a source or channel of ground water contamination. A well that poses a hazard to human health must also be plugged under subsection (c). A cased or uncased bucket well or a hand dug well (other than buried slab construction) that was abandoned before January 1, 1988, shall be closed in conformance with one (1) of the following procedures:

(1) Covered with a reinforced concrete slab:

(A) at least four (4) inches thick; and

(B) having a diameter larger than the nominal diameter of the borehole or the well casing.

(2) Equipped with a properly reinforced cover:

(A) constructed of pressure treated lumber; ~~using chromium copper arsenic salt, that has~~

(B) having dimensions larger than the nominal diameter of the borehole or well casing; ~~The cover shall be~~ **and**

(C) protected against the water with roofing or other water repelling materials that are properly maintained to ensure the integrity of the cover.

Closure shall not be performed under this subdivision, however, if the cover is in direct contact with ground water or surface water.

(3) Closed as otherwise approved by the division.

(b) A well drilled before January 1, 1988, and abandoned before January 1, 1994, shall be **as follows:**

(1) Sealed at or above the ground surface by a welded, threaded, or mechanically attached watertight cap. ~~The well shall be~~

(2) Maintained so the well does not become a source or channel of ground water contamination.

A well that poses a hazard to human health must also be plugged under subsection (c).

(c) A well abandoned after December 31, 1987, shall be plugged with an impervious grouting material to prevent the **following:**

(1) Migration of materials or fluids in the well. ~~and the~~

(2) Loss of pressure in a confined aquifer.

(d) A well drilled after December 31, 1987, and not equipped with casing must be plugged within seventy-two (72) hours after completion.

(e) This subsection applies as follows to a cased or uncased well abandoned after December 31, 1987:

(1) The plugging material must consist of one (1) or a combination of the following:

(A) Neat cement with not more than five percent (5%) by weight of bentonite additive.

(B) Bentonite slurry, which can include polymers designed to retard swelling.

(C) Pelletized, medium grade, or coarse grade crushed bentonite.

(D) Other materials approved by the commission.

(2) The following methods apply:

(A) Cement and bentonite slurries shall be pumped into place in a continuous operation with a grout pipe introducing the

plugging material at the bottom of the well and moving the pipe progressively upward as the well is filled.

(B) Plugging materials other than neat cement or bentonite slurry shall be installed in a manner to prevent bridging of the well or borehole. The well or borehole shall be measured periodically throughout the plugging process to ensure that bridging does not occur.

(3) The following procedures apply:

(A) An abandoned well shall be disconnected from the water system. Any substance that may interfere with plugging shall be removed, if practicable.

(B) A well, other than:

(i) a monitoring well;

(ii) a dewatering well; or

(iii) an uncased borehole;

shall be chlorinated before abandonment as provided in 312 IAC 13-9-1.

(4) A cased well shall be plugged as follows:

(A) With neat cement, bentonite slurry, or medium grade or coarse grade crushed or pelletized bentonite from the bottom of the well to within two (2) feet below the ground surface unless otherwise provided by the department.

(B) The well casing shall be severed at least two (2) feet below the ground surface, and a cement plug larger in diameter than the borehole shall be:

(i) constructed over the borehole; and

(ii) covered with natural clay material to the ground surface.

(5) An uncased well (other than a borehole drilled by a bucket rig or a dewatering well governed by subdivision (8) or (9)) shall be filled with:

(A) natural clay materials;

(B) neat cement;

(C) bentonite slurry; or

(D) medium grade or coarse grade crushed or pelletized bentonite;

from the bottom of the borehole to a depth of ~~no~~ **not** less than twenty-five (25) feet below ground surface. The borehole shall be filled with neat cement or medium grade or coarse grade crushed or pelletized bentonite from a depth ~~no~~ **not** less than twenty-five (25) feet below ground surface to within two (2) feet below ground surface. The remaining borehole shall be filled with natural clay material to ground surface.

(6) A cased or uncased monitoring well shall be plugged from the bottom of the well or borehole to the ground surface with a:

(A) bentonite slurry; or

(B) pelletized or coarse grade crushed bentonite.

(7) A bucket well shall be plugged as follows:

(A) A bucket well installed as buried slab construction shall be filled with gravel from the bottom of the well to within ten (10) feet below the ground surface. Neat cement, bentonite slurry, or pelletized, medium grade, or coarse grade crushed bentonite shall be installed in the casing or well pipe from ~~no~~ **not** less than ten (10) feet below the ground surface to within two (2) feet below the ground surface. The well pipe shall be:

(i) severed at least two (2) feet below the ground surface; and

(ii) covered with a cement plug larger in diameter than the well pipe.

The remaining hole shall be filled with natural clay material to the ground surface.

(B) Bucket well construction:

(i) using casing with an inside diameter of less than twelve (12) inches extending the entire length of the borehole; and

(ii) equipped with a well screen;

shall be abandoned under subdivision (4)(A).

(C) An uncased borehole drilled by a bucket rig shall be filled with natural clay material:

(i) from the bottom of the hole to the ground surface; ~~The clay material shall be~~ **and**

(ii) thoroughly tamped to minimize settling.

(D) For other than buried slab construction, a bucket well shall be filled with gravel from the bottom of the well to at least five (5) feet below ground surface. The top section of the concrete or tile well casing shall be removed to cause the top of the well to terminate below ground surface. The well shall be filled with at least one (1) foot of:

(i) neat cement;

(ii) bentonite slurry; or

(iii) pelletized, medium grade, or coarse grade crushed bentonite;

from at least five (5) feet below ground surface to the top of the well casing. The well casing shall be covered with a cement plug larger in diameter than the borehole. The remaining hole shall be filled with natural clay material to ground surface.

(8) If a dewatering well casing is removed following use, the remaining borehole shall initially be filled with granular, pelletized, medium grade, or coarse grade crushed bentonite a minimum of one (1) foot thick. The remainder of the borehole shall be:

(A) filled with natural earth materials obtained during the drilling process to the ground surface; and ~~bc~~

(B) thoroughly tamped to minimize settling.

(9) If a dewatering well casing is removed following use and the well site will be excavated as part of the construction project, the remaining borehole shall be:

(A) filled with natural earth materials obtained during the drilling process to the ground surface; and ~~bc~~

(B) thoroughly tamped to minimize settling.

(f) The division shall be notified in writing of a well abandonment within thirty (30) days after plugging is completed. *(Natural Resources Commission; 312 IAC 13-10-2; filed Nov 22, 1999, 3:34 p.m.: 23 IR 773; readopted filed Aug 4, 2005, 6:00 p.m.: 28 IR 3661)*

Notice of Public Hearing

Under IC 4-22-2-24, notice is hereby given that on April 24, 2006 at 9:00 a.m., at the Indiana Government Center-South, 402 West Washington Street, Conference Center Room 7, Indianapolis, Indiana the Natural Resources Commission will hold a public hearing on proposed amendments to 312 IAC 13-8-1, 312 IAC 13-8-3, and 312 IAC 13-10-2, governing water well drilling contractors, to apply new grouting requirements to geothermal heat pump wells, replace numerical diameter requirements for a monitoring well by a functionality requirement, modify the standards for a filter pack seal in a monitoring well, establish standards for a monitoring well constructed by the direct push method, and, for a cover on a bucket well or a hand dug well that was abandoned before January 1, 1988, no longer authorize lumber if treated with chromium copper arsenic salt.

The Natural Resources Commission is authorized to adopt the proposed amendments under IC 25-39-4. The Department of Natural Resources estimates approximately 25 small business will be directly affected by the proposed rule changes. The changes will have no adverse annual impact on small businesses. Approximately 1,100 monitoring wells are reportedly installed annually in Indiana. The most notable consequence of the changes is that they would allow monitoring wells to be installed more efficiently and at a lower cost with the potential for increasing revenue for these small businesses. Also, the amendments do not impose an additional requirement or cost under IC 4-22-2-24(d). Persons who require the installation of monitoring wells may receive a cost saving.

Copies of these rules are now on file at the Indiana Government Center-South, 402 West Washington Street, Room W272 and Legislative Services Agency, One North Capitol, Suite 325, Indianapolis, Indiana and are open for public inspection.

Rick Cockrum
Chairman
Natural Resources Commission