IOWA DEPARTMENT OF NATURAL RESOURCES
GOVERNOR KIM REYNOLDS
LT. GOVERNOR ADAM GREGG
DIRECTOR KAYLA LYON

May 7, 2020

VIA E-MAIL

TIFFANY AYER
AGRICO CHEMICAL COMPANY
13830 CIRCA CROSSING DRIVE
LITHIA FL 33547

Re: Request for Cessation of Groundwater Monitoring, Former Agrico Chemical Company Facility, Fort Madison, Iowa dated April 17, 2020

Dear Ms. Ayer:

The Iowa Department of Natural Resources, Contaminated Sites Section, (Iowa DNR) has reviewed the above referenced request submitted by TRC Environmental Corporation on behalf of Agrico Chemical Company and the request to close out groundwater monitoring at the Former Agrico Chemical Company Facility is accepted as written.

All monitoring wells and piezometers not required for other environmental programs shall be properly plugged as noted in 567 Iowa Administrative Code (IAC) 39, *Requirements for Properly Plugging Abandoned Wells.* Iowa DNR Form 542-1226, *Abandoned Water Well Plugging Record,* will need to be filled out as described in IAC-39.6(2.) for each monitoring well and submitted to me. IAC-39.5(4) requires wells to be properly plugged within 90 days of abandonment, however, Iowa DNR understands the COVID-19 protocols for your employer and your contractor(s) may require an extended period to complete the well abandonment. The monitoring wells will need to be maintained until they can be plugged.

If you have any questions or need further information please feel free to call or e-mail at (515) 725-8371 or dan.cook@dnr.iowa.gov.

Sincerely,

Daniel Cook
Environmental Specialist Senior
Contaminated Sites

encl: 567 Iowa Administrative Code 39, *Requirements for Properly Plugging Abandoned Wells*
Iowa DNR Form 542-1226
Plugging Abandoned Wells in Iowa (Brochure)

c: Dan Madison, TRC, 50 International Drive, Suite 150, Patewood Plaza Three, Greenville, SC 29615 via e-mail

CHAPTER 39
REQUIREMENTS FOR PROPERLY PLUGGING ABANDONED WELLS

567—39.1(455B) Purpose. The purpose of this chapter is to implement Iowa Code section 455B.190 by providing a schedule and required procedures for the proper plugging of abandoned wells to protect the groundwater by permanently sealing off contamination to individual aquifers.

567—39.2(455B) Applicability. These rules govern the proper plugging of abandoned wells. Some examples of types of wells covered by these rules are those accessing groundwater (withdrawing water from or injecting water into the groundwater) and can include, but are not limited to: public and nonpublic water wells, test wells, observation wells, monitoring wells, agricultural drainage wells, heat pump recirculation wells, and cooling water wells. Some examples of types of wells or subsurface structures not covered by these rules include: small diameter (2" or less) test holes, observation wells or monitoring wells installed for a limited time which can be sealed by withdrawal of the casing and allowing the hole to collapse; soil borings; septic tanks; underground storage tanks; and cisterns if not used for accessing groundwater. For additional guidance and background information, refer to "Guidelines for Plugging Abandoned Water Wells," Technical Information Series 15, Geological Survey Bureau, Iowa Department of Natural Resources, 1987.

567—39.3(455B) Definitions.

"Abandoned well" means a water well which is no longer in use or which is in such a state of disrepair that continued use for the purpose of accessing water is unsafe or impractical.

"Agricultural lime" means all calcium and magnesium products sold for agricultural purposes in the carbonate form, not including quicklime or hydrated lime, of a size comparable with that of crushed stone, gravel or pea gravel.

"Approved" means accepted or acceptable under an applicable specification stated or cited in these rules.

"Aquifer" means a water-bearing geologic formation capable of yielding a usable quantity of water to a well or spring.

"Bentonite" means a naturally occurring highly plastic, colloidal clay composed largely of the mineral montmorillonite which expands upon wetting.

"Bentonite grout (or slurry)" means a mixture of 10 percent processed bentonite (by weight) and water which is free of contaminants, turbidity and settleable solids.

"Bentonite pellets" means a form of processed bentonite which can be used directly for sealing applications in well plugging operations.

"Bentonite products" means the forms of bentonite which can be used for sealing material in wells, including graded bentonite, bentonite pellets and bentonite grout.

"Capped" means the application of a layer of sealing material at the top of the well casing.

"Casing" means a tubular retaining structure installed in an excavated hole to maintain the well opening.

"Certified well contractor" means a well contractor certified by the department in accordance with 567—Chapter 82.

"Class 1 well" means a well 100 feet or less in depth and 18 inches or more in diameter.

"Class 2 well" means a well more than 100 feet in depth or less than 18 inches in diameter or a bedrock well. Bedrock wells include:

1. Wells completed in a single confined aquifer;
2. Wells completed in a single unconfined aquifer; and
3. Wells completed in multiple aquifers.

"Class 3 well" means a sandpoint well or a well 50 feet or less in depth constructed by joining a screened drive point with lengths of pipe and driving the assembly into a shallow sand and gravel aquifer.

"Concrete" means a mixture of one sack (94 pounds) of Portland cement, up to but not exceeding an equal amount by volume of sand and up to but not exceeding an equal amount by volume of gravel

or crushed stone and not more than six gallons of water which is free of contaminants, turbidity and settleable solids.

"Confined aquifer" means an aquifer in which the groundwater is under pressure greater than atmospheric pressure. The static water level in a well tapping a confined aquifer rises to a level above the top of the aquifer.

"Crushed stone" means stone (predominantly limestone), crushed and well graded, with 100 percent passing a 1-inch sieve, in accordance with the 1984 edition of Iowa department of transportation specification No. 4120.04 for Class A crushed stone.

"Department" means the department of natural resources created under Iowa Code section 455A.2.

"Designated agent" means a person other than the state, designated by a county board of supervisors to review and confirm that a well has been property plugged.

"Director" means the director of the department.

"Filling materials" means agricultural lime, soil, sand, gravel, crushed stone, rock and pea gravel used to occupy space between and below sealing materials in abandoned wells being plugged.

"Frost pit" means a sunken area located directly over or within 4 feet of a well and used to house the equipment for discharging water from a well into the water system.

"Graded bentonite" means bentonite which is crushed and sized for pouring and easy handling. Like processed bentonite, it swells when hydrated with water and will form a plastic, essentially impermeable mass.

"Gravel" means stone screened from river sand or quarried, with 100 percent passing a ¾-inch sieve, in accordance with the 1984 edition of the Iowa department of transportation specification No. 4120.02 for Class B gravel.

"Groundwater" means any water beneath the surface of the earth.

"Grout" means, for the purposes of this chapter, a fluid mixture of cement and water (neat cement); sand, cement and water (sand cement grout); or bentonite and water (bentonite grout or slurry) of a consistency that can be forced through a pipe and placed as required.

"Limestone" means sedimentary rock which contains greater than 50 percent calcium carbonate and has a strong reaction with hydrochloric acid (HCL).

"Neat cement" means a mixture of one sack (94 pounds) of Portland cement to not more than six gallons of water which is free from contaminants, turbidity or settleable solids. Bentonite up to 2 percent by weight of cement may be added to reduce shrinkage.

"Owner" means the titleholder of the land where an abandoned well is located.

"Pea gravel" means gravel sized from 1/8 inch to 3/8 inch in diameter.

"Plug" means the closure of an abandoned well with plugging materials by procedures which will permanently seal the well from contamination by surface drainage and permanently seal off the well from contamination into an aquifer. This involves the proper application of filling and sealing materials.

"Processed bentonite" means bentonite which has been kiln dried and processed into pellets for direct use in well sealing applications or into powder or coarse granules for use in bentonite grout for sealing.

"Rock" means stone screened from river sand or quarried, free of debris, foreign matter and any toxic or agricultural chemical residue, up to 2½ inches in diameter.

"Sand" means clean, medium-textured quartz (concrete sand) and shall be at least 25 percent with diameters between 2.0 and 0.25 mm, less than 35 percent with diameters between 0.25 and 0.05 mm and less than 5 percent with diameters between 0.002 and 0.05 mm.

"Sand cement grout" means a mixture of one sack (94 pounds) of Portland cement, an equal amount by volume of sand and not more than six gallons of water which is free from contaminants, turbidity and settleable solids.

"Sandpoint well" means a small diameter water well constructed by joining a screened drive point with lengths of pipe and driving the assembly into a shallow sand and gravel aquifer.

"Sealing" means the proper placement of sealing materials into an abandoned well to seal off flow into, out of or between aquifers.

"Sealing materials" means bentonite products. Sealing materials may also include neat cement, sand cement grout and concrete.

"Standby well" means a water well which is temporarily taken out of service with the expectation of being returned to service at a future date.

"Static water level" means the water level in a water well or aquifer when the well is not flowing or being pumped; sometimes referred to as the water line. The static water level for an abandoned well is determined just prior to commencing plugging operations.

"Tremie pipe" means a device, usually a small diameter pipe, that carries grouting materials to the bottom of the hole and which allows pressure grouting from the bottom up without introduction of air pockets.

"Unconfined aquifer" means an aquifer in which the static water level does not rise above the top of the aquifer, i.e., the pressure of the water in the aquifer is approximately equal to that of the atmosphere.

"Water well" means an excavation that is drilled, cored, bored, augered, washed, driven, dug, jetted or otherwise constructed for accessing groundwater.

567—39.4(455B) Forms. The following form is currently in use: Abandoned Water Well Plugging Record. 542-1226.

567—39.5(455B) Abandoned well plugging schedule.

39.5(1) Class 1 wells abandoned prior to April 25, 1990, must be properly plugged by July 1, 1995.

39.5(2) Class 2 and 3 wells abandoned prior to April 25, 1990, must be properly plugged by July 1, 2000.

39.5(3) Wells near contamination sources. All classes of wells abandoned prior to April 25, 1990, and located less than 200 feet from an active well supplying potable water or located less than 660 feet from a point source of potential contamination which may include, but is not limited to, industrial waste sites; uncontrolled hazardous waste sites; petroleum storage areas; hazardous waste treatment, storage, or disposal areas; agricultural chemical storage areas; animal feedlots; and wastewater treatment facilities must be properly plugged by July 1, 1993.

39.5(4) Wells abandoned after April 25, 1990. All classes of wells which are abandoned on or after April 25, 1990, must be properly plugged within 90 days of the date of abandonment.

567—39.6(455B) Abandoned well owner responsibilities.

39.6(1) *Plugging requirements.* The owner is responsible for ensuring the abandoned well is plugged pursuant to this chapter.

39.6(2) *Record.* It is the responsibility of the owner to certify, on DNR Form 542-1226 "Abandoned Water Well Plugging Record," that an abandoned well has been plugged in accordance with the requirements and time schedule contained in this chapter. This report must include confirmation of the well plugging by the designated agent for the county or a certified well contractor. Within 30 calendar days of the date the plugging was completed, the owner shall submit to the department a copy of DNR Form 542-1226.

567—39.7(455B) Abandoned well plugging materials.

39.7(1) *Sealing materials.* Approved sealing materials are bentonite products (graded bentonite, bentonite pellets and bentonite grout), neat cement, sand cement grout and concrete.

39.7(2) *Filling materials.* Approved filling materials include agricultural lime, soil, sand, pea gravel, gravel and crushed stone. The filling materials shall be free of debris, foreign matter and any toxic or agricultural chemical residue. Filling materials are not required for well plugging.

567—39.8(455B) Abandoned well plugging procedures.

39.8(1) *Freedom from obstructions.* Abandoned wells must be checked before they are plugged in order to ensure there are no obstructions that may interfere with plugging operations. Drop pipes, check valves, pumps, and other obstructions shall be removed if practical.

39.8(2) *Class 1 wells.* These wells may be plugged by pouring filling and sealing materials from the top of the well or by using tremie pipes, except for sand cement grout or concrete placed below the static water level, which must be placed by tremie pipe or dump bailer.

Filling materials of sand, gravel, crushed stone, rock, pea gravel or agricultural lime shall be placed up to 1 foot below the static water level; soils are not permitted below the static water level due to naturally occurring bacteriological, organic and inorganic contaminants. A minimum of 1 foot of bentonite pellets, graded bentonite or neat cement shall be placed on top of the filling material up to the static water level as a seal. Sand cement grout or concrete applied with a tremie pipe or dump bailer also may be used on top of the filling material up to the static water level and in standing water above the static water level to act as a seal. Filling material may then be added up to 4 feet below the ground surface.

It is preferable that the filling materials be omitted and that sealing materials be used to fill the entire well up to 4 feet below the ground surface. Sand cement grout or concrete shall be placed with a tremie pipe or dump bailer when used below the static water level.

The casing pipe and any curbing, frost pipe or pump house structure shall be removed to a depth of 4 feet below the ground surface and shall be capped by a minimum of 1 foot of bentonite pellets, graded bentonite, neat cement, sand cement grout or concrete. The cap shall extend 6 or more inches beyond the outside diameter of the top of the remaining well casing and shall terminate 3 feet below the ground surface. The remaining 3 feet (below the ground surface) shall then be backfilled with soil and graded so that surface water is directed away from the abandoned well location.

39.8(3) *Class 2 wells other than bedrock wells.* If the details of well construction are unknown or obstructions that may interfere with well plugging cannot be removed, the well shall be tremied full of neat cement or bentonite grout up to 4 feet below the ground surface. If bentonite grout is used from the static water level to the top of the well, it should be capped by neat cement, sand cement grout or concrete terminating 4 feet below the ground surface.

Filling material consisting of sand, gravel, crushed stone, pea gravel or agricultural lime shall be placed in the bottom of the well up to 4 feet below the static water level. A minimum of 4 feet of sealing materials consisting of any bentonite products or neat cement shall be added above the filling material up to the original static water level. If bentonite grout or neat cement is used, it shall be placed by tremie pipe. If graded bentonite or bentonite pellets are used, they may be added by pouring in place and agitating to avoid bridging. Sealing materials shall be added above the static water level up to 4 feet below the ground surface. If bentonite grout is used from the static water level to the top of the well, it should be capped by neat cement, sand cement grout or concrete terminating 4 feet below the ground surface.

It is preferable that the filling materials be omitted and that sealing materials be used to fill the entire well up to 4 feet below the ground surface.

Casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of 4 feet below the ground surface. The remaining 4 feet shall then be backfilled with soil and graded so that surface water is directed away from the abandoned well location.

39.8(4) *Class 2 bedrock wells.* If the details of well construction are unknown or obstructions that may interfere with well plugging cannot be removed, the well shall be tremied full of neat cement or bentonite grout up to 4 feet below the ground surface. If bentonite grout is used from the static water level to the top of the well, it should be capped by neat cement, sand cement grout or concrete terminating 4 feet below the ground surface.

The casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of 4 feet below the ground surface. The remaining 4 feet shall then be backfilled with soil and the surface shall then be graded to divert water away from the abandoned well location.

a. Bedrock wells completed in a single confined aquifer. Before proceeding to plug the well, a bridge plug or packer shall be placed at or below the bottom of the casing to stop the flow of water where the pressure in the confined aquifer causes the water to flow from the well to the surface. In such cases, filling materials shall be placed in the lower portion of the well before the bridge plug or packer is set.

Filling material consisting of pea gravel, crushed stone, gravel or agricultural lime shall be placed from the bottom of the well up to 10 feet below the bottom of the casing or confining layer, whichever is lower. Sealing materials consisting of any bentonite products, sand cement grout or neat cement shall be placed from the top of the filling material to at least 10 feet above the bottom of the casing or confining layer or to the static water level, whichever is higher. If bentonite grout, neat cement or sand cement grout is used, it shall be placed by tremie pipe. If graded bentonite or bentonite pellets are used, they shall be added by pouring in place and agitating to avoid bridging. The casing shall then be filled up to 4 feet below the ground surface with sealing materials. If bentonite grout is used from the static water level to the top of the well, it should be capped by neat cement, sand cement grout or concrete terminating 4 feet below the ground surface.

It is preferable that the filling materials be omitted and that approved sealing materials be used to fill the entire well up to 4 feet below the ground surface.

The casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of 4 feet below the ground surface. The remaining 4 feet shall then be backfilled with soil and graded so that surface water is directed away from the abandoned well location.

b. Bedrock wells completed in a single unconfined aquifer. The plugging procedure for these wells is the same as for bedrock wells completed in a single confined aquifer except that a bridge plug or packer is not required to stop the flow of water since this problem will not exist in this type of well.

c. Bedrock wells completed in multiple aquifers. For the lowest aquifer, filling material consisting of pea gravel, crushed stone, gravel or agricultural lime shall be placed from the bottom of the well up to 10 feet below the bottom of the casing or confining layer, whichever is lower. Neat cement tremied in place shall then be placed as a sealing material on top of the fill and extend upward at least 20 feet. Sealing materials shall then be placed in at least the top 10 feet of each subsequent aquifer and extend at least 10 feet into the confining layer or casing above. The same type of filling materials and sealing procedures shall apply for each subsequent aquifer. Filling material may be placed from the top of the uppermost aquifer seal up to the static water level of the well. The casing shall then be filled with approved sealing or filling materials to 4 feet below the ground surface. If bentonite grout is used from the static water level to the top of the well, it should be capped by neat cement, sand cement grout, or concrete terminating 4 feet below the ground surface.

It is preferable that the filling materials be omitted and approved sealing materials be used to fill the entire well up to 4 feet below the ground surface. Sand cement grout or concrete shall be applied with a tremie pipe or dump bailer when applied below the static water level.

The casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of 4 feet below the ground surface. The remaining 4 feet shall then be backfilled with soil and graded so that surface water is directed away from the abandoned well location.

39.8(5) *Class 3 wells.* The preferred method of plugging a sandpoint well is to pull the casing and sandpoint out of the ground, allowing the hole to collapse and fill. If the sandpoint and casing cannot be extracted, they shall be tremied full of neat cement or completely sealed with bentonite products.

The casing pipe and any curbing, frost pit or pump house structure shall be removed to a depth of 4 feet below the ground surface. The remaining 4 feet shall then be backfilled with soil and graded so that surface water is directed away from the abandoned well location.

567—39.9(455B) Designated agent. A county's board of supervisors shall appoint an individual to be responsible to review and confirm an abandoned well to be properly plugged as required by 567—39.8(455B) and authorized by Iowa Code section 455B.190. The designation is effective upon notification to the department by the chairperson of the board of supervisors. This notification will include the identity of the designated agent and the length of appointment. Changes in a designated agent will require new notification by the chairperson to the department.

567—39.10(455B) Designation of standby wells.

39.10(1) *Standby wells.* A standby well must be disinfected prior to being taken out of use for a long period of time and must be disinfected and, as a minimum, checked for bacteria and nitrates when placed

back in service. Disinfection of standby wells shall be done in accordance with AWWA (American Water Works Association) Standard A100. The well must not be subject to contamination by surface drainage or from other causes, and the well casing must be provided with an airtight cover when the well is not in use. A well must be repaired so that there is no degradation of groundwater and it is suitable for use prior to being classified as a standby well.

39.10(2) *Caveat.* Nothing in these rules shall be construed as exempting public water supply wells from requirements set forth in the environmental protection commission rules, 567—Iowa Administrative Code.

567—39.11(455B) Variances. In accordance with Iowa Code section 455B.181, a variance to these rules may be granted by the department provided sufficient information is submitted in writing to the department to substantiate the need for a variance and to ensure the protection of all aquifers penetrated by the affected well. When satisfactory justification has been submitted to the director demonstrating that a variance to these rules will result in equivalent effectiveness or improved effectiveness, a variance to these rules may be granted by the director. A denial of a variance may be appealed to the environmental protection commission pursuant to 567—Chapter 7.

These rules are intended to implement Iowa Code sections 455B.171 and 455B.190.

[Filed 9/29/88, Notice 4/20/88—published 10/19/88, effective 11/23/88][1]
[Filed 3/2/90, Notice 11/15/89—published 3/21/90, effective 4/25/90][2]
[Filed 8/31/90, Notice 7/11/90—published 9/19/90, effective 10/24/90]
[Filed without Notice 4/23/93—published 5/12/93, effective 7/1/93]

[1] Effective date (11/23/88) delayed until adjournment of the 1989 Session of the General Assembly pursuant to Iowa Code section 17A.8(9) by the Administrative Rules Review Committee at its November 15, 1988 meeting.

[2] Effective date of 39.8(3), second paragraph, first sentence, and 39.8(4)*"a,"* second paragraph, first sentence, delayed 70 days from 4/25/90 by the Administrative Rules Review Committee at its 4/12/90 meeting.

IOWA DEPARTMENT OF NATURAL RESOURCES

Abandoned Water Well Plugging Record

1. **Owner:**

Name: _____ Phone: _____

Address: _____

City: _____ State: _____ Zip: _____

If this was a Public Water Supply Well, please provide:

PWSID Name: _____ PWSID Number: _____

2. **Location of Well (Cistern):**

_____ ¼ of, _____ ¼ of, _____ ¼ of, Section _____ , T _____ N, R _____ ☐ East ☐ West

County: _____ Describe well location on property: _____

GPS Well Location: Latitude: _____ Longitude: _____

3. **Well Description:**

Well depth: _____ ft

Depth to water _____ ft.

Casing depth: _____ ft. Casing Material: ☐ Steel ☐ Plastic ☐ Concrete ☐ Clay ☐ Brick ☐ Stone

Casing diameter: _____ in.

Year or decade constructed: _____ Type of Construction: ☐ Drilled ☐ Driven ☐ Bored ☐ Augured ☐ Dug

Is this a Monitoring Well? ☐ Yes ☐ No Well ID: _____

Check if Cistern ☐ Depth: _____ ft. Diameter: _____ ft.

I certify this well has been plugged as required by rule 567-39.8 of the Iowa Administrative Code (IAC). I agree to provide any additional information the county or department may need concerning this well.

Signature of Owner _____ Date Plugged: _____

If plugged by certified well contractor, complete this box:

I have plugged this well as required by rule 567-39.8 of the Iowa Administrative Code (IAC).

Signature of Contractor: _____ Cert No: _____

OR, If plugged by well owner, complete this box:

The property owner has plugged this well following requirements in rule 567-39.8 of the Iowa Administrative Code (IAC) with the oversight and assistance of the designated county agent.

Signature of County Agent: _____ Date Approved: _____

Eligible for Grants-to-Counties cost share: ☐ Yes ☐ No (Determined by County Agent)

Complete one form for each well plugged and submit within 30 days to the local county agent:

OR, only if no county agent is available, to:

Water Supply Section
Iowa Department of Natural Resources
502 E 9th St
Des Moines IA 50319-0034

Who can plug a well?

The DNR recommends that you hire an Iowa DNR certified well contractor to plug your well. As a well owner, you can do the work yourself if two conditions are met. 1) The well owner must plug the well following the current well plugging rules under supervision of the local county environmental health department, and 2) A certified well contractor or the local county environmental health agent must sign and submit a form stating that the well was plugged following the state's current well plugging rules.

If you want to plug your own well, please keep in mind that if you don't have supervision from a certified well contractor or your local county environmental health department, the well will not qualify for any cost share assistance under the Grants to Counties (GTC) well plugging program.

Please contact your local county environmental health office or the DNR for more information.

When to plug?

All wells which are abandoned must be properly plugged within 90 days of the date of abandonment or when the abandoned well is discovered.

Can I get financial assistance?

Financial assistance is available through your local county environmental health department under the Grants to Counties (GTC) Well Program. Administration of the GTC Well Program is through The Bureau of Environmental Health Services at the Iowa Department of Public Health. The bureau works closely with Iowa DNR, who provides technical oversight of water well testing, water well closure, and water well renovation under the GTC program.

Counties that participate in the GTC program can reimburse property owners up to $500 for each well plugged and $1000 for each well renovated.

For more information contact:

Your local county environmental health department

http://www.iowadnr.gov/Portals/idnr/uploads/water/wells/co_sanitarians.pdf

Or contact:

The Iowa Department of Natural Resources

Private Well Program at (515) 725-0462

Available web sites:

Iowa Private Well Plugging Program
www.iowadnr.gov/wellplugging

Iowa's Well Plugging Rules – Chapter 39
www.legis.iowa.gov/docs/iac/chapter/03-24-2010.567.39.pdf

Find an Iowa DNR Certified Well Contractor
www.iowadnr.gov/wellcontractorcert

Iowa DNR Private Well Program
www.iowadnr.gov/privatewells

Iowa Department of Public Health
Grants to Counties Well Program
https://idph.iowa.gov/Environmental-Health-Services/Grants-to-Counties-Water-Well-Program

Plugging Abandoned Wells in Iowa

Partners in protecting your drinking water

Iowa Department of Natural Resources
Iowa Department of Public Health

Why plug your old wells?

In 1987, the Iowa Groundwater Protection Act was passed by our legislature to help prevent further contamination of one of Iowa's most precious resources; our groundwater. Proper plugging of abandoned wells was included in the legislation as well as a funding mechanism to help assist well owners with the cost of plugging wells.

Abandoned wells can be a direct pathway for contaminants to enter the groundwater and cause water quality problems for nearby existing wells and any future wells. In addition, large diameter wells, well pits, and cisterns also pose a safety hazard for people, pets, and livestock because the large openings may give-way leading to injury.

By definition, the term "abandoned well" means any well that is no longer in use, or is in such poor physical condition that it cannot be repaired to be safely used. The term can apply to all wells including public drinking water wells, monitoring wells, commercial wells, private supply wells, heat pump wells, and irrigation wells.

Abandoned wells should be properly plugged, renovated to today's well protection standards, or repaired, capped, and designated as a "standby" well. Each of these options is designed to meet the goals of protecting groundwater from further contamination and eliminating safety hazards.

What types of materials are needed?

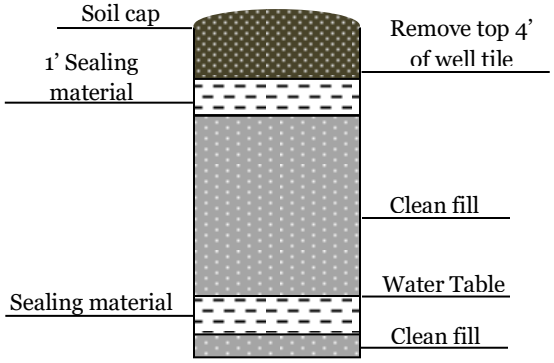
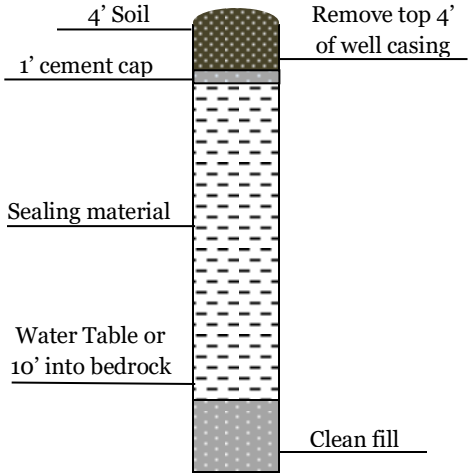
Properly plugging a well requires the use the right materials – both fill materials *AND* sealing materials.

Fill is clean, granular material such as washed sand or pea gravel which is used in larger diameter wells to fill space and reduce the cost of plugging.

Sealing material is bentonite clay or "neat" cement (cement mixed without sand or gravel) and is used to seal the earth's natural confining layers that were penetrated during the construction of the well.

How do you plug a well?

Wells in Iowa fall into one of three well classes when we talk about well plugging. The method of well plugging used will depend on the well class, what is known about the well, the measured well depth, and the local geology. See the table below to identify each type of well and view one example on how it should be plugged. For others, see Chapter 39.

	Dimensions	Description	Diagram
Class 1	Greater than 18 inches in diameter or less than 100 feet deep; typically located in central, southern and western Iowa; potential physical and pollution hazards. Commonly called bored wells, dug wells, augured wells, seepage wells, or cistern wells.	Slowly place alternating layers of fill and sealing material. One foot of sealing material is used at the top of the water table, and again four feet from the top of the well to achieve the required seal. Fill is used between plug layers. Or you can omit all of the fill material and use only sealing material to completely plug the well.	
Class 2	Less than 18 inches in diameter or more than 100 feet deep; these can occur anywhere in Iowa, especially in northern and eastern Iowa; potential pollution hazards. Commonly called cased wells, drilled wells, deep wells, or artesian wells.	The plugging procedure for Class 2 wells will depend on the geologic formation that the well penetrates and whether or not a well log exists for the well. Because of this we recommend that you hire a Certified Well Contractor to plug all Class 2 wells. Find certified well contractors at the following web site: www.iowadnr.gov/wellcontractorcert	
Class 3	2 inches or less in diameter and shallow, 50 feet or less in depth. Commonly called sandpoint wells or driven wells.	Wells can be plugged by simply pulling the pipe from the ground and then filling the hole with bentonite clay, or if it cannot be pulled out, the pipe can be cut four feet below the surface and the well filled with sealing material.