



Improperly Abandoned Wells can be

HAZARDOUS

to your Health

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he article headline on www.SixWise.com is almost too intriguing to resist: “The Six Most Dangerous Types of Abandoned Places and What Makes Them so Risky.” Most of the selections—abandoned mines and quarries, abandoned factories, and abandoned houses and apartment buildings—are pretty obvious. But number five wouldn’t necessarily leap to mind: abandoned wells.

“There are tens of thousands of abandoned wells across the country,” the article states, “but you typically only hear about them during a tragedy, such as a child falling into one. Risks of abandoned wells include:

- They’re often hidden by grass, brush, or collapsed buildings.
- They’re wide enough that children, pets, and wild animals can fall into them and get trapped.
- They can damage farm equipment that may roll over a hidden well.
- They threaten groundwater supplies by allowing toxins (or other contaminants) to flow directly into water supplies.”

While interesting, the article understates the threat of abandoned wells. More accurately, there are millions of improperly abandoned water wells and other types of wells or holes in the subsurface across the country. And while it may be difficult to document, the greatest threat to human health is likely not people falling into the wells but the pathways these wells create, allowing contamination into aquifers.

“In addition to water supply wells, many types of holes or wells may affect aquifers,” states the National Ground Water Association’s (NGWA) *Manual of Water Well Construction Practices*. “These include mineral exploration holes, seismic holes, solution or ‘in situ’ mining wells, dewatering wells, temporary service wells, construction water wells, production wells, monitoring and/or other structures that affect the withdrawal from or quality of water in an aquifer. There are literally millions of such holes across North America. In some areas, ... open holes can be a serious threat to groundwater quality and personal or physical safety.”

Undertake a Land Survey

To address this issue, a good first step is for landowners to survey their property for abandoned wells. It may not be as easy as you think. Even if you receive water from a public water system, there still may be one or more improperly abandoned wells on your property from years past, and it is your responsibility. Not only do most states have regulations requiring proper well abandonment, called “well decommissioning,” you could be liable if an aquifer gets fouled by contamination entering the aquifer through an improperly abandoned well on your land.

The Michigan Department of Environmental Quality (MDEQ), like a number of other state-level agencies, has published some excellent guidelines for locating abandoned wells. MDEQ says there are more than one million abandoned wells in that state alone.

“Generally, there is one abandoned well per generation that the property has been occupied,” MDEQ reports. “Some abandoned wells are obvious because they stick above the ground, above a basement floor, or a hand pump or a windmill remains attached to

the well. Others terminate below the ground within structures known as well pits. A 'well trained eye' can pick out signs of these structures. Many older abandoned wells were buried below the frost line. Finding them requires a metal detector or other sophisticated electronic instruments followed by excavation. Some abandoned wells are under buildings or roadways and may never be found. When searching for abandoned wells, a landowner must take on the role of an investigator."

What should I investigate?

MDEQ suggests that people should examine physical evidence, speaking with individuals, search local records, and use common tools to aid in the search for abandoned wells.

Physical Evidence

Look for:

- Windmills or hand pumps.
- Casing (steel or plastic) visible above the ground or a concrete slab or basement floor.
- Small outbuildings.
- A pit in the yard or basement.
- A basement offset (small room off the basement).
- Crock, brick, or stone structures.
- A manhole cover.
- Water system components (pressure tank, pump, control box).
- A waterline or patched hole through the basement floor or wall.
- A circular ring in cement or patch in the floor.
- A patch in a step or concrete (access for well below).
- A damp circular depression in the yard.
- Additions, false walls, access panels that may hide the well.
- Old building sites recognizable by an old foundation.
- Ornamental shrubs, flowers, or trees outlining old home or farm sites.

national ground water awareness week

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Ground Water Awareness Week

A good time to publicize well decommissioning and groundwater protection is during National Ground Water Awareness Week, which next takes place on March 7–13, 2010. Each year during National Ground Water Awareness Week, NGWA and its promotional partners seek to educate the public about groundwater protection, proper well construction, regular well maintenance, and regular water testing and treatment if necessary.

To learn more about National Ground Water Awareness Week, visit www.wellowner.org.

Talk with Individuals

Absent physical clues, try talking with:

- Previous owners.
- Relatives or acquaintances who may know about the property.
- Neighbors (neighboring wells may give clues as to the well location, depth, etc).
- Contractors (well drillers, plumbers, builders) who have worked on the property.
- Inspectors (well, plumbing, building, septic system).
- Current or former employees or maintenance personnel.

Records Search

The following may be useful before beginning a physical search:

- Water well and pump records or abandoned well plugging records filed with local government (often the county).
- Water well or sewage disposal permits filed with local government.
- City, township, or county officials—zoning or building permits.
- Municipal water department records on water line extensions to homes previously served by water wells.

- Old photographs of the property.
- Aerial photos of the property (showing windmills, well houses).
- Owner's records (bills, receipts, deed easements) or information written on pressure tank, pump control box, etc.

Equipment and Tools

The following tools can be helpful in locating abandoned wells where no physical evidence may be detectible above ground:

- A metal detector.
- A tape measure or "snake" to follow pipes out through walls.
- Digging equipment including shovels, hammers, chisels, and backhoes.
- A magnetometer or electromagnetic anomaly detector (these are available through groundwater consultants).

Securing the Site

Once an abandoned well has been located, the next step is to use a qualified water well system contractor to decommission it correctly. The contractor should be authorized to do business in the state and should be familiar with any applicable well decommissioning standards.

While state standards for well decommissioning may vary, "The basic concept governing [well

decommissioning] is the restoration, as far as feasible, of the hydrogeologic conditions that existed before the borehole was drilled and the well constructed. This serves the purposes of removing the abandoned well as a conduit for loss of hydrologic pressure in confined formations, intermingling of groundwater of differing quality, and entry of contaminated and polluted water," states NGWA's *Manual of Water Well Construction Practices*.

Generally, a qualified water well system contractor begins with a search of any records pertaining to the well to learn more about what's involved with that particular well.

Next the contractor removes all materials from a well that may hinder its proper sealing such as pump parts, pitless adaptors, pipe, wire, and fallen debris. Sometimes well screens used to screen out sand, gravel or other particulate at the bottom of the well can be removed.

If feasible, the contractor will often remove the well casing—the large, vertical pipe that fits down into the borehole. If removal of the well casing is not feasible, there are methods of preparing the well casing to help ensure the best possible sealing of the well.

Once the borehole is properly prepared, the water well contractor can use specialized grout to fill the well from the bottom up. The purpose of the special grout, which expands when cured, is to keep surface water from working its way down the borehole and to prevent water from different levels of the subsurface from mixing and getting into the aquifer.

Different methods are needed when decommissioning an artesian well, which is a well from which water flows without the aid of a pump due to natural pressure. Check with your local health department for requirements specific to your location.

A Coordinated Approach to Well Decommissioning

In addition to individual property-owner responsibility, NGWA advocates a coordinated approach by all levels of government (federal,

state, and local) to effectively protect and manage groundwater quality. The assignment of groundwater quality management responsibilities is best based on the particular strengths of each governmental level and the nature of the resource.

The federal government's role has been one of research, technology transfer, and funding assistance, while states have traditionally managed water development including regulating drillers, well construction and decommissioning, and water withdrawals.

Local governments control land use, which is an essential element in protecting groundwater and preventing inappropriate uses of sites where the potential for exposure to wastes and/or contaminated groundwater exists. Federal and state groundwater protection and management efforts should recognize the need for land use controls and coordinate groundwater management with local governments.

Some state and local governments or other organizations, such as conservation districts, have well decommissioning programs that may include financial assistance. If you are a property owner, find out if such a program is available near you through a Web search or by contacting the agency that oversees well construction in your state.

If you are with a public or private water utility, you may want to consider a groundwater protection campaign that educates the public about finding and decommissioning abandoned wells. For example, the California Groundwater Association (CGA) has collaborated with other local entities to conduct a well decommissioning for the news media/public.

"Typically, we'll find a person who is financially needy, such as an elderly person or someone who is ill, and then go to our CGA members to supply the materials and do the work," says Mike Mortenson, CGA executive director. At the same time, CGA will contact the local county supervisors and environmental health department to invite

news media and explain the importance of proper well decommissioning during the demonstration project. Local government involvement helps ensure news media turnout.

A demonstration project also highlights the importance of using qualified water well system contractors to decommission a well. Mortenson recalls one CGA demonstration where a 20- to 30-foot-deep "dug" well was being decommissioned. Dug wells are large diameter wells that are hand dug. "As we were clearing material out of the well, we discovered a drilled well at the bottom that went down another 100 feet," says Mortenson, underscoring the fact that not all well decommission jobs are routine, and that it requires special expertise, equipment and techniques to do the job correctly. Well owners who attempt to fill the borehole with concrete or other materials will not only jeopardize the aquifer's water quality, they're likely breaking the law.

Mortenson says that collaborating to conduct a demonstration project is just one approach to publicizing the importance of well decommissioning, but it's a good one that has accomplished at least four worthwhile objectives for CGA. "We are getting the word out about protecting groundwater through well decommissioning, we are helping a needy person, we are collaborating with other local officials who have a shared concern with us, and we are raising public awareness about the need to use qualified water well system contractors."

More Information

The National Ground Water Association site (www.ngwa.org) has information about a variety of groundwater topics. For a list of authorized well contractors, visit the NGWA site at www.ngwa.org/govaffairs/statelic.aspx. Applicable well decommissioning standards may be found at www.ngwa.org/govaffairs/statereg.aspx.



Cliff Treyns is the director of public awareness with the National Ground Water Association. Learn more about the NGWA by visiting their website at www.ngwa.org.