
Wisconsin Drinking Water Law and Current Ground Water Problems

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WISCONSIN was one of the first states to pass a law regulating well drilling to safeguard the quality of drinking water. Since 1919, the Wisconsin statutes have provided the state board of health with broad powers for the regulation of well construction and water systems related to public and institutional supplies. The need to supervise private water supplies was also recognized, for the number of typhoid cases in rural areas was greater than that in municipal areas with supervised wells. Finally, in 1935, Chapter 162 of the statutes was passed. This allowed the board of health to supervise all wells supplying water used for human consumption.

In the early days, when the settlers came to Wisconsin to build homes and start farms, the supply of safe water was no problem. A farm spring was a source of clear, cold water that served to refrigerate food and provide drink for settlers and livestock. This situation changed with the growth of the population. When people began living closer together and industry began to grow, a water supply problem was created. Supervision and planning were needed to insure safe water.

This study of the economic and political aspects of the passage and ad-

ministration of the Wisconsin law may be valuable as a guide for other states that do not yet have adequate regulations on drinking water, and as a procedural guide for the several humid states now attempting to revise laws regulating the allocation of water among competing users. Existing regulations on water use are repeatedly becoming inadequate because of increased demands.

Content of the Law

Chapter 162 of the Wisconsin statutes specifies the powers of the state board of health to prescribe and enforce minimum reasonable standards and rules for procuring and protecting drinking water for human consumption. An important part of this law was the provision requiring the registration of well drillers. Specifically, the powers of the state board of health are defined in the law (162.01) as follows:

The state board of health shall . . . determine, and after a public hearing, prescribe, publish, and enforce minimum reasonable standards and rules and regulations for methods to be pursued in the obtaining of pure drinking water for human consumption and the establishing of all safeguards deemed necessary in protecting the public health against the

hazards of polluted sources of impure water supplies intended or used for human consumption, including minimum reasonable standards for the construction of well pits. It shall have general supervision and control of all methods of obtaining ground water for human consumption, including sanitary conditions surrounding the same, the construction or reconstruction of wells . . . and shall do and perform any act deemed necessary for the safeguarding of public health.

The detailed regulations prescribed by the board of health, after a public hearing was held, are contained in Chapter H 55 of the Wisconsin Administrative Code.

Passage of the Law

The state board of health played an important role in the introduction of the legislation; the law was passed on the first attempt. The board was concerned with the high incidence of unsafe water samples submitted to the state laboratory of hygiene. In 1935, 70 per cent of all the samples submitted were found to be unsafe. Fortunately, Wisconsin was one of the few states that provided free bacteriologic analysis of water samples. Through the years, records of these analyses proved that a serious water sanitation problem existed. The records were important in educating the legislature on the nature of the problem and convincing it of the need for action. If this specific information had not been available, it would have been difficult to make people aware of the situation. A private citizen is usually satisfied if he has been getting water from his own well for years with no apparent harmful effects. Another factor that served to point up the problem and arouse public support for the law was a survey of school wells in the state, which showed that many were unsafe.

Regulation of Wells

The law, as originally enacted, requires the registration and regulation of well drillers working on wells that will supply water for human consumption. This classification includes the wells of utilities and the private wells found in rural areas. The statute does not regulate wells supplying water for livestock, although this water may later be used for human consumption. Also, a farm may be sold, and the new owner might use for his own supply, water formerly given to livestock. If livestock wells were regulated, a farmer, in addition to improving his personal well, would have to pay the expense of improving his livestock well, in order to meet the minimum standards. Perhaps this consideration was the reason that livestock wells were not included in the law, for such a provision might have aroused additional opposition to its passage.

Any penetration into water-bearing strata may be a source of contamination of an underground supply, but drilling in conjunction with mining operations is not regulated. Eventually, perhaps, all drilling that might affect an underground supply will have to be controlled.

Administration of the Law

The administrative code prescribed by the state board of health to govern well construction has been amended several times. The first edition of the code was published in 1936, and amendments and revisions were made in 1939, 1951, and 1953. In 1951, a major attempt was made to clarify the code, which was difficult to interpret and, therefore, the basis for many conflicts. Formerly, the code presented the requirements for well drill-

ing in a narrative fashion. The code was revised and the requirements presented in tabular form so that drillers could easily determine what was expected of them. Statute drafters and administrators should note that simply from the use of tables instead of long accounts difficult to read, much opposition to the statute and the possibility of future conflict resulting from misinterpretation were eliminated. Equally important were the provisions of the statute that authorized, in conjunction with administration, the education of the public in the merits of the law.

By 1953, some well drillers criticized the board, claiming that it was not doing its job and that many violations were occurring. The board brought in another staff member and began to suspend drillers who had violated code provisions. Even today, after various revisions of code regulations have been made, there are problems of interpretation. These problems are ever present when rules deal with highly technical material, and when drillers who must interpret the rules are not familiar with the terminology used and the related technicalities.

Well construction requirements are adaptable to the geologic and ground water conditions existing at the site of a well. To this extent, the rules may be applied to a specific area. They are not fixed statewide without regard for the specific technical conditions involved. Problems concerning exceptions to the rule still arise. For example, the requirements for well casings in areas where the water-bearing formation is limestone lying relatively close to the surface, prescribe that the well must be cased to a depth of 40 ft. In some areas of the state, compliance with this requirement puts the casing

down below the water-bearing strata, and thus no water can be pumped. This is only one instance when a code must be flexible enough to adapt to a specific situation. The Wisconsin code does provide for such flexibility.

There are only two men in the central office of the board of health devoting full time to the administration of the statute. Eight engineers and six sanitarians in the district offices attend to the law at different times. In addition, there are central office milk sanitarians and district hotel and restaurant inspectors who give valuable assistance. The budget of the well-drilling division of the board is approximately \$25,000 per year.

Driller Monopoly

After years of observing the effects of the water law, the Wisconsin Well Drillers Association felt that the law was too lenient about granting permits to drillers. Anyone could get a permit upon application and payment of a fee, even if he had no experience or equipment. In 1953, the legislature passed an amendment (162.04 [3]) that specified 2 years of experience with a well driller registered in Wisconsin as a condition for the granting of a permit. This largely satisfied the state's well drillers and, at the same time, gave them an element of monopoly control over newcomers to the business. Although it was unplanned, one of the most stringent effects of this experience requirement was that it prohibited out-of-state drillers from operating in Wisconsin. Experienced and highly qualified drillers from another state, who had not operated in Wisconsin before the passage of the amendment, cannot now get a permit unless they are in a position to work 2 years for a registered driller.

Minimum and Ideal Standards

One of the critical features of well installations is the surface seal between the pump and the well casing. Improper pump and pipe installations can make a good well unsafe by leaving an opening through which contaminated matter may enter. To insure the construction of a completely safe well, it is important that standards and registration requirements be established for pump installers as well as for well drillers. Such a provision (162.04) was added to the Wisconsin statute in 1953, although the controversy between drillers and pump installers about who was to blame when a well proved to be unsafe was evident at the time the original law was passed in 1935. As was mentioned for the nonregulation of livestock wells, perhaps the reason for the delay in regulating pump installations was to facilitate the passage of the 1935 statute controlling well drilling.

The controversy over the regulation of well pits is a more concrete example of the acceptance of minimum standards instead of the ideal standards formulated by technicians. The 1936 and 1939 editions of the well code allowed the construction of well pits. On Jul. 27, 1951, the code was revised to prohibit the construction or reconstruction of well pits on farms producing milk for sale. Although the code made no reference to existing pits, this revision came close to enforcing ideal sanitary conditions. The dairy farmers objected, because the abolition of well pits would necessitate costly aboveground well houses that had to be heated. A number of hearings were held in 1952, at which time farm organizations and business groups suggested changes.

In 1953, the legislature passed an amendment to Chapter 162 of the statutes providing that the well code must include minimum reasonable standards for the construction of well pits. On Apr. 10, 1953, the board of health published new regulations that allowed pits if a permit was obtained for them. Such a permit is granted where a reasonably safe water supply is assured. The board allowed a 3-year compliance period for the nonconforming owners of well pits.

This was a compromise that allowed minimum reasonable standards instead of an ideal standard. Perhaps, as the poorer pits are abandoned in the future, the more stringent regulation will be reinstated.

Group Interests

To understand the political processes and the resulting law, it may be helpful to mention some of the groups of people who have interests in the water law and to examine some of the issues behind these interests. From the opposing groups come the compromises that make for a workable law.

Well Drillers

The well drillers themselves make up the main group involved. If there are no minimum standards, well drillers can undersell competitors by cutting down on the quality of the work. Cheaper materials, such as lighter gage casings, can be used. A farmer is tempted to take the lowest bid on a well, for he is probably unaware of all the elements involved in the construction of a good well. To the layman, a well is satisfactory as long as it supplies clean-looking and apparently safe water. But if minimum standards of well construction and

minimum requirements for well driller registration are enforced, a well owner, though he is still not certain of getting the full return on his investment, will, at least, be paying for a product that meets the minimum standards.

It is difficult, however, to get the public to support a statute on well drilling. A farmer who has been getting "good" water out of his old, dug well for years, may feel that a law setting up minimum requirements is the height of technical idealism. People are likely to believe that odor-free, crystal clear, cold water without unpleasant tastes is also safe water. As mentioned earlier, the public health data on the frequency of unsafe water samples were an important factor in defining the problem. Legislators are sensitive to this kind of information.

Probably the chief reason that well drillers opposed the regulation was because of the requirement that certain hydrologic and geologic data on each well drilled be given to the state board of health. This requirement is not a part of the statute, but it is a part of the administrative code that requires a formal report on well construction, as prescribed by the board of health. The well drillers argue that their private knowledge of the geology of their area, accumulated after many years of experience, is an essential part of their business, and to have to give up this information to others is unfair. If a well driller does not know what geologic formations he is likely to encounter while drilling a well, he must include the costs resulting from this uncertainty in his overall price. Therefore, the local driller who knows his area has a price advantage over neighboring competitors who are less familiar with it.

This argument was much more valid in times past than it is today. Through the fine work of USGS and state geologic surveys, reliable geologic information is available to anyone. The local driller, therefore, really has no monopoly on the data of his area. There may exist, however, certain geologic peculiarities in particular areas. If detailed log data of these places were provided by a well driller and made public, it would help a competitor who was not aware that an unusual problem existed. But this does not happen often. To accommodate the drillers, the Wisconsin State Board of Health does not make the log data supplied by drillers available to the general public. The data are available to USGS and to other researchers, but they are not published. Also, such data are helpful to the state board of health for supervisory purposes. It is impossible for the board's staff to inspect every well; log data give the board a basis for determining whether the well construction requirements for a particular geologic formation have been followed.

Drillers have much to gain from close cooperation with state geologists who can give them valuable technical advice when they are bidding on a contract. For example, the geologists can show the drillers the areas in which particular contract specifications might be impossible to fulfill. They can point out certain risks involved, and the driller can adjust his bid accordingly. Also, when the drillers are on a job and difficulties arise, the geologists can be of help. Of course, there are areas in which geologic conditions vary so widely that the only resort is to drill a test well. The state board of health and state geolo-

gists can also help defend a driller who has tried his best to meet all requirements but who, because of factors beyond his control, is being criticized for drilling a well that is unsafe.

Important to the success of the Wisconsin statute is the cooperation of the well drillers among themselves. Even before the law was passed, drillers worked through their own association in an orderly manner, overcoming the jealousies that arise from the keeping of trade secrets. In the early days, local drillers did not help a rival if he was thought to be drilling in an area outside his own. The efforts of the association overcame these suspicions and resulted in more cooperation among drillers. The well drillers realize that if one of them drills an unsafe well, it reflects on all of them. Thus, they have a real interest in rules that protect those who try to do a good job against the few others who do substandard work. It is important to note that a critical factor in the formation of the water law was the established practices of drillers that later became codified and modified to conform to public interests.

Dairy Industry

There are several other groups that have an interest in the regulation of well drilling. The dairy industry in general is very concerned about the availability of safe water. Of course, when regulations affect a person's finances, the general good is more difficult to see, as when a dairy farmer is forced to abandon an old, dug well that may have been poorly located and incur the cost of a new well. In Wisconsin, between 1953 and 1955, Grade A dairy farmers thought that the state board of health requirements were

causing them a lot of unnecessary expense. At the time, the farmers were confused by the fact that the Grade A administrators of the Chicago milkshed realized the need for safe water and started to evaluate the water supply requirements of the milk ordinance and code of USPHS, which were revised in 1953 and which had requirements similar to the Wisconsin statute. Today, when the Grade A administrators enforce the federal requirements, a reasonable state statute on well drilling should not affect the average dairy farmer.

Manufacturers

Manufacturers of well equipment are probably not too concerned about the water law. A standardization of the kinds of equipment required, however, should be beneficial to manufacturers. It does away with the need to stock many varieties of supplies, such as well casings. Even more significant is the fact that the regulations increased the drillers' demand for better quality equipment.

Industry in General

Industrial water users in general support the law. Food processors, especially, cannot risk the chance of a contaminated water supply. Industrial wells whose waters are not used for human consumption are not regulated under the Wisconsin statute. They are, however, subject to review under another statute, also administered by the state board of health, regulating high-capacity wells. The board has the right to condition a well construction permit and try to avoid the possibility of contamination. Where a high-capacity well (100,000 gpd) is drilled, the well owner must apply for a permit.

Recreational Areas

Recreational areas also have an interest in safe water, for tourists naturally expect it. If word gets out that a recreational facility does not have safe water, its business can be ruined. An example of this occurred in Door County, Wis., several years ago. The state board of health knew of the unsatisfactory water conditions in a particular area, but the persons responsible did not cooperate with the board in remedying the situation. Everything came to a head with an outbreak of dysentery that ruined the reputation and tourist business of the area for a long time. After that incident, the state board of health was given cooperation. Unfortunately, this case illustrates the unhappy but common occurrence of people failing to remedy a potential danger until something unpleasant actually happens.

Success of the Law

In retrospect, the two most important elements of the Wisconsin law are: [1] the provisions for revocation and suspension of permits, which give the law its teeth; and [2] the regulation of pump installers, for complete control of possible sources of contamination.

Through the years, the number of registered well drillers has remained relatively constant at 400. The number of pump installers is approximately 1,700. It is estimated that there are 300,000 rural wells in Wisconsin. About 8,000-10,000 drilled wells, including new wells and modifications of old wells, are worked on each year.

As evidence of the success of the Wisconsin law and its administration, the percentage of water samples found unsafe by the state laboratory of hygiene has now dropped to 20 per cent,

compared to the 70 per cent level of 1935. These figures include all samples submitted from all sources, including tests for new wells and old.

Conclusions and Policy Implications

Some of the insights gained from Wisconsin's experience with the passage and administration of its drinking water law may be helpful to the development of other water regulations and allocation laws.

Students of government have always been plagued by the difficulty of overcoming public apathy and arousing public action before a problem has become so serious that its nature is obvious. If definite information about the number of unsafe well samples had not been available to more or less shock the people into action, it is doubtful that the water law would have been passed in 1935. The situation is similar today. Several humid states, including Wisconsin, are experiencing difficulty with the laws governing allocation of rights to water. As was done prior to the passage of Wisconsin's drinking water law, responsible persons should now be collecting information that will point up the problem to the public, so that a decision can be made before matters become critical. Some of the data needed can be found in well logs required by the well driller regulation. It must be mentioned again that these data should be obtained in a manner that will not arouse well driller opposition, which could frustrate the efforts of states trying to provide safe water supplies.

New regulations to meet new problems are the result of a process that takes place over a period of time. The important provision regulating pump installers, ignored until 1953, and the regulation of well pits came about

gradually. The one best or ideal law cannot be passed once and for all. Any legislation is the culmination of a series of compromises. Critical provisions must be considered first, other items added later. Legislation should not be discussed only as an academic ideal but also as a practical and possible solution to a given problem at a specific time.

Then there is the problem of establishing general rules where widely varying conditions exist. Well construction rules are based on geologic and ground water conditions. It has been suggested that Wisconsin establish water use zones as a basis for regulation. This idea is based on the knowledge that some areas have critical water problems; other areas have plenty of water and either do not need to be regulated or require regulations different from those of critical areas. It is very difficult, however, to draw lines on a map setting up practical zones. Geologists say that they do not yet know enough to set up specific zones based on scientific knowledge. Even when the experts believe that they have enough data to zone an area, and agreements are made on the dividing lines, which happened with Wisconsin forest zoning, the final partition of land may be quite different than was planned. Although zoning decisions may be based on the best technical data

available, the final plan depends on what the public wants.

A regulatory body must be adequately staffed and financed if it is to do more than just check on complaints of violations of a statute. The available staff must be large enough to carry on advance planning and to present a program of improvement and development.

Finally, custom and practice are important considerations in the development of formal regulations. An important factor in the passage of the well driller regulation was the cooperation among well drillers within their association, and an awareness that the regulation protected the capable driller against the irresponsible practices of drillers who did substandard work that gave the entire industry a bad reputation. As conflicts among ground water users increase, information should be gathered on how these conflicts are now being resolved, though no formal procedures and laws may be available yet in many states.

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