

<p>Docket Number: <u>58-0111-0601</u> Effective Date: <u>2007 Sine die</u> Rules Title: <u>Ground Water Quality Rule</u> Agency Contact and Phone: <u>Ed Hagan, 373-0356</u></p>	<p style="text-align: center;">Public Notice</p> <p>Negotiated Rule Making: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Groups Involved: Sign in sheet attached.</p>
<p>Descriptive Summary of Rule: The purpose of this rulemaking is to make revisions that would allow the Department of Environmental Quality (DEQ) to use improvements in analytical technology implemented since the Ground Water Quality Rule was promulgated in 1997 to identify the subset of coliform bacteria more likely to be harmful to human health. The proposed revisions augment the ground water quality standards for bacteria by adding standards for fecal coliform and <i>Escherichia coli</i> (<i>E. coli</i>) bacteria.</p> <p>The proposed standard for both fecal coliform and <i>E. coli</i> bacteria is less than one viable colony or less than one colony forming unit/100 ml as determined by any EPA approved method. This standard is based on comments received from the state health lab during negotiated rulemaking. The state health lab indicated that test results for bacteria may be reported three ways: as zero, presence or absence, or less than one. A standard of less than one would satisfy all three reporting options. In addition, DEQ proposes to remove the reference to Subsection 200.01.c. from Subsection 400.02.a.iii. The reference to Subsection 200.01.c. is no longer correct due to revisions made to Section 200 in 2003.</p> <p>In the preliminary draft for negotiated rulemaking, DEQ proposed to remove the standard for total coliform bacteria to eliminate redundancy due to the proposed addition of standards for fecal coliform and <i>E. coli</i> bacteria. However, during the negotiated rulemaking process, DEQ received comments in favor of maintaining the current total coliform standard due to its widespread use, both historically and currently.</p> <p>As proposed, the numerical ground water quality standard for bacteria will become a two-step process. The first step will be to screen the sample for bacteria using total coliform testing. If the primary ground water quality standard of 1 colony forming unit/100 ml for total coliform is exceeded, an additional analysis for fecal coliform or <i>E. coli</i> would be conducted to determine if the bacteria are likely to be harmful to human health. Laboratory tests currently in use can identify <i>E. coli</i> or fecal coliform when total coliform bacteria are present in the sample.</p> <p>This phased implementation approach would eliminate the redundancy in the rule caused when standards for fecal coliform and <i>E. coli</i> are added, while maintaining the total coliform standard. It also allows DEQ to fulfill statutory requirements by requiring an action – testing for fecal coliform or <i>E. coli</i> - when a standard is exceeded. More importantly, the proposed rule change enables DEQ and other agencies to focus resources on those sites where bacterial impacts are the result of fecal contamination and are more likely to pose a threat to human health.</p> <p>No public comments were received; however, a correction has been made to the proposed rule publication error in the footnote for total coliform (Subsection 200.01.a.). DEQ recommends that the Board adopt the rule, as presented in the final proposal, as a pending rule with the final effective date coinciding with the adjournment <i>sine die</i> of the First Regular Session of the Fifty-ninth Idaho Legislature. The rule is subject to review by the Legislature before becoming final and effective.</p>	<p>Hearings: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Locations and Dates: N/A</p>
	<p>Written Comment Deadline: 8/2/06</p>
	<p>Cost Impact: Agency: None anticipated. Regulated Community: None anticipated.</p>
	<p>Relevant Statutes: Idaho Code Sections 39-105, 39-107, 39-120, and 39-126.</p>
<p>Idaho Code § 39-107D Statement: Statement attached.</p> <p>Idaho Code § 67-5221(c) Fiscal Impact Statement: The following is a specific description, if applicable, of any negative fiscal impact on the state general fund greater than ten thousand dollars (\$10,000) during the fiscal year: N/A</p>	

Temporary Rule Necessary to protect public health, safety or welfare
 Compliance with deadlines in amendments to governing law or federal programs
 Conferring a benefit

Docket Number: 58-0111-0601

Section	Existing Rule Summary	Temporary and/or Proposed Rule Summary	Summary of Rule Changes Based on Public Comment	Outstanding Issues
200	Ground Water Quality Standards.	<p>The proposed revisions augment the ground water quality standards for bacteria by adding standards for fecal coliform and <i>Escherichia coli</i> (<i>E. coli</i>) bacteria. The proposed standard for both fecal coliform and <i>E. coli</i> bacteria is less than 1 viable colony or colony forming unit/100 ml using any EPA approved method. As proposed, the numerical standard for bacteria would become a two-step process. The addition of a footnote for total coliform describes the two-step process:</p> <p><i>An exceedance of the primary ground water quality standard for total coliform is not a violation of these rules. If the primary ground water quality standard for total coliform is exceeded, additional analysis for fecal coliform and E. coli will be conducted. An exceedance of the primary ground water quality standards for either fecal coliform or E. coli is a violation of these rules.</i></p>	<p>No comment received. The footnote was revised to correct an error in the published proposed rule:</p> <p><i>An exceedance of the primary ground water quality standard for total coliform is not a violation of these rules. If the primary ground water quality standard for total coliform is exceeded, additional analysis for fecal coliform and <u>or</u> E. coli will be conducted. An exceedance of the primary ground water quality standards for either fecal coliform or E. coli is a violation of these rules.</i></p>	None.

Docket Number: <u>58-0111-0601</u>				
Section	Existing Rule Summary	Temporary and/or Proposed Rule Summary	Summary of Rule Changes Based on Public Comment	Outstanding Issues
400	Ground Water Contamination.	Removed the reference to Subsection 200.01.c. from Subsection 400.02.a.iii. The reference to Subsection 200.01.c. is no longer correct due to revisions made to Section 200 in 2003.	No comment received. No change.	None.

IDAHO CODE § 39-107D STATEMENT

Section 39-107D, Idaho Code, provides that DEQ must meet certain requirements when it formulates and recommends rules which are broader in scope or more stringent than federal law or regulations. There is no federal law or regulation that is comparable to the Ground Water Quality Rule. Therefore, the changes to the rule are not broader in scope or more stringent than federal law or regulations.

Section 39-107D, Idaho Code, also applies to a rule which "proposes to regulate an activity not regulated by the federal government." This rule may be used to regulate an activity not regulated by the federal government. The following is a summary of additional information required by Sections 39-107D(3) and (4), Idaho Code. Information relating to Section 39-107D(2) has also been provided. The requirements set forth in this rule are based upon best available peer reviewed science and studies and analyses conducted by other states, the U.S. Environmental Protection Agency (EPA), the Centers for Disease Control and Prevention (CDC), the U.S. Food and Drug Administration (FDA), and professional scientific and medical journals. The referenced studies and analyses will be included in the rulemaking record and can be reviewed during the public comment period for further detailed information regarding health effects.

Section 39-107D(2)(a), Idaho Code. To the degree that a department action is based on science the department shall utilize the best available peer reviewed science and supporting studies conducted in accordance with sound objective scientific practices.

The presence of *E. coli* or fecal coliform in water is universally accepted as evidence that the water has been contaminated with the fecal material of man or other animals. Fecal contamination is an indicator that a potential health risk exists for individuals exposed to or ingesting this water. The requirements set forth in this rule are based upon best available peer reviewed science and studies and analyses conducted by other states, the U.S. Environmental Protection Agency (EPA), the Centers for Disease Control and Prevention (CDC), the U.S. Food and Drug Administration (FDA), and professional scientific and medical journals. The referenced studies and analyses will be included in the rulemaking record and can be reviewed during the public comment period for further detailed information regarding health effects.

Section 39-107D(2)(b), Idaho Code. To the degree that a department action is based on science, the department shall utilize data collected by accepted methods or best available methods if the reliability of the method and the nature of the decision justifies use of the data.

Data were not collected or analyzed by DEQ as part of this rulemaking process. DEQ relied on information readily available to the public from federal and state government publications and articles from medical and scientific professional journals.

Section 39-107D(3)(a), Idaho Code. Identification of each population or receptor addressed by an estimate of public health effects or environmental effects.

Escherichia coli (*E. coli*) is a normal inhabitant of the intestines of all animals including humans. The primary reservoir of this bacterium has been found to be healthy cattle (Jackson et al., 1998). While there are many harmless *E. coli* strains, *E. coli* O157:H7 can cause food- and waterborne illness. *E. coli* O157:H7 causes approximately 73,000 infections and about 61 deaths per year in the U.S (CDC, 2005). It was first recognized in 1982, when it was associated with two foodborne outbreaks of bloody diarrhea and abdominal cramps (Gugnani, 1999).

Hemorrhagic colitis is the name of the acute disease caused by *E. coli* O157:H7 (FDA, 2005). *E. coli* O157:H7 infection often causes severe bloody diarrhea and abdominal cramps; sometimes the infection causes diarrhea or other symptoms. This bacterium produces potent toxins (verotoxins) related to *Shigella* toxins. The incubation period is 3–4 days, and the symptoms occur for 7–10 days (Moe, 1997; Rice, 1999). Usually little or no fever is present. However, in some persons, particularly children under 5 years of age and the elderly, the infection can cause a complication called hemolytic uremic syndrome (HUS), in which the red blood cells are destroyed and the kidneys fail. About 2%-7% of infections lead to this complication. In the United States, HUS is the principal cause of acute kidney failure in children, and most cases of HUS are caused by *E. coli* O157:H7. HUS is a life threatening condition usually treated in an intensive care unit. Blood transfusions and kidney dialysis are often required. With intensive care, the death rate for HUS is 3%-5% (CDC, 2005). In the elderly, HUS, plus two other symptoms, fever and neurologic symptoms constitutes thrombotic purpura (TTP). This illness can have a mortality rate in the elderly as high as 50% (FDA, 2005).

One route of human exposure to *E. coli* is through the consumption of contaminated drinking water. The bacteria are shed in animal and human fecal matter, and drinking water sources may become contaminated during rain or snowmelts that wash *E. coli*-contaminated wastes into surface and ground water. If the source water is not properly treated, drinking water may remain contaminated with *E. coli* (USEPA, 2006a). Additionally, bacteria can contaminate ground water as a result of malfunctioning septic systems, leaking sewer lines, and above-ground pathways that extend below the surface, such as deep cracks in the ground.

Although *E. coli* O157:H7 is not usually a concern in treated drinking water, outbreaks involving consumption of drinking water contaminated with human sewage or cattle feces have been documented (Swerdlow et al., 1992; Bruce-Grey-Owen Sound Health Unit, 2000).

E. coli O157:H7 infections can be deadly. Recent water related outbreaks of *E. coli* O157:H7 in North America include a May 2000 tragedy in Walkerton, Ontario, where 7 people died and approximately 2,300 persons became ill from consuming *E. coli* O157:H7-contaminated ground water. Of the more than 2,300 individuals affected, 65 were hospitalized, 27 developed hemolytic uremic syndrome (HUS), a serious and potentially fatal kidney ailment (Hrudley et al, 2002). In 1999, at a fair near Albany, New York, approximately 804 cases of *E. coli* O157:H7 infections were linked to consumption of contaminated ground water. Sixty-five people were hospitalized and two people died (USEPA, 2006a). There were also drinking water *E. coli* O157:H7 outbreaks reported in Wyoming, Illinois, and Washington in 1997 and 1998; all were associated with contaminated ground water systems (Barwick et al, 2000).

Section 39-107D(3)(b) and (c), Idaho Code. Identification of the expected risk or central estimate of risk for the specific population or receptor and identification of each appropriate upper bound or lower bound estimate of risk.

The U.S. EPA (USEPA, 2006b) reports that preliminary data from eight ground water microbial studies of public water system wells indicate pathogen occurrence rates from 6% to 12% and pathogen indicator occurrence rates of 12% to 38%. If these occurrence rates are extrapolated to Idaho, where approximately 400,000 people are not served by regulated public water systems, but rely on private domestic wells to withdraw ground water for drinking water people, then between 24,000 and 152,000 Idahoans are potentially at risk.

This estimate of risk does not include the approximately 1 million Idahoans served by regulated public water systems. About 95% of these public water systems use ground water as the source of their drinking water. If treatment used by the public water systems fails to work properly during a bacterial contamination event then incidents similar to those reported in the previous section could occur. The threat associated with this possibility is not quantified.

In 1995, a significant bacterial contamination event occurred in Island Park, Idaho resulting in 82 cases of shigellosis. The likely cause of the contamination is believed to be leakage from nearby septic tanks or sewer lines. The findings of the investigation indicated possible transmission from multiple wells in the same area, suggesting the spread of organisms through the groundwater (CDC, 1996).

Section 39-107D(3)(d), Idaho Code. Identification of each significant uncertainty identified in the process of the assessment of public health effects or environmental effects and any studies that would assist in resolving the uncertainty.

According to the Center for Risk Science and Public Health at The George Washington University School of Public Health and Health Services, “much of what is known about the risk factors in populations comes from outbreak data. In the United States, waterborne disease outbreaks are tracked using voluntary passive surveillance techniques by the Centers for Disease Control and Prevention (CDC) in collaboration with the Environmental Protection Agency. State and local health departments may report the epidemiologic data from an outbreak to CDC, but reporting varies by the type of outbreak, state, infectious agent, and time period. Such data often do not include the demographic or other characteristics essential for assessing inter-individual differences in susceptibility. Exposure analysis is also very limited, and water quality parameters are not always included in the analysis” (Balbus and Embrey, 2002).

"The likelihood that individual cases of illness will be detected, epidemiologically linked, and associated with water is slim. For an outbreak to be detected, a series of events must happen. First, people who are ill must consult a health care provider, and generally, at least two patients must consult the same provider for an association to be made. Next, the health care provider must recognize the possibility of an outbreak and perform appropriate laboratory testing or report the cases to a local or state health department. The availability and patterns of use of laboratory testing, the requirements for laboratories or physicians to report results to local or state health departments, and the activities of state and local health and environmental agencies all affect the likelihood that an outbreak will be recognized and reported. Often, pathogens are not identified because the appropriate tests are not ordered. For example, most laboratories do not test for *Cryptosporidium parvum* on a routine ova and parasites examination, and *E. coli* O157:H7 will not be detected from a routine stool culture. The most frequently identified etiologic agents traced to both drinking water and recreational water outbreaks representing the three pathogen classifications, protozoa, viruses, and bacteria, are *Giardia* and *Cryptosporidium*, Norwalk-like viruses, and *E. coli* O157:H7" (Balbus and Embrey, 2002).

According to information from the U.S. Food and Drug Administration (FDA, 2005) the infective dose of *E. coli* is unknown, but from a compilation of outbreak data, the dose may be similar to that of *Shigella* spp (as few as 10 organisms). A study of outbreak data indicates less than 50 *E. coli* organisms can result in an infective dose (Tilden et al, 1996).

Studies have shown that the *E. coli* dose required to produce symptoms is lower than that for most other enteric pathogenic bacteria. The probability of becoming ill depends on the number of organisms ingested, the health status of the person, and the resistance of the person to the organism or toxin (AWWA Committee Report, 1999). Children and the elderly are most susceptible to HUS complications. In susceptible individuals such as infants, the elderly, and immunocompromised individuals, the effects may be severe, chronic (e.g., kidney damage), or even fatal.

Section 39-107D(3)(e), Idaho Code. Identification of studies known to the department that support, are directly relevant to, or fail to support any estimate of public health effects or environmental effects and the methodology used to reconcile inconsistencies in the data.

The referenced studies and analyses will be included in the rulemaking record and can be reviewed during the public comment period for further detailed information regarding health effects.

References

AWWA (American Water Works Association) Committee Report (1999) *Emerging pathogens — bacteria*. J. Am. Water Works Assoc., 91(9): 101–109.

Balbus JN, and Embrey MA, (2002). *Risk factors for waterborne enteric infections*. Current Opinions in Gastroenterology 2002, 18:46-50.

Barwick RS, et al, (2000). *Surveillance for waterborne-disease outbreaks*. Morb Mortal Wkly Rep Surveill Summ 49(SS04):1-35 (2000)

Bruce-Grey-Owen Sound Health Unit (2000) *The investigative report on the Walkerton outbreak of waterborne gastroenteritis*. May–June, Owen Sound (http://www.publichealthgreybruce.on.ca/_private/Report/SPReport.htm).

CDC (U. S. Centers for Disease Control and Prevention) (2005). Division of Bacterial and Mycotic Diseases. *Escherichia coli* O157:H7. General Information (fact sheet). Available: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm.

CDC (U.S. Centers for Disease Control and Prevention) (1996) *Shigella sonnei* Outbreak Associated with Contaminated Drinking Water – Island Park, Idaho August 1995, MMWR Weekly, March 22, 1996 / 45(11); 229-231.

FDA (U. S. Food and Drug Administration), (2005) *Foodborne Pathogenic Microorganisms and Natural Toxins Handbook: Escherichia coli* O157:H7. Available: <http://www.cfsan.fda.gov/~mow/chap15.html>

Gugnani, H.C. (1999) Some *emerging food and water borne pathogens*. J. Commun. Dis., 31(2): 65–72.

Hrudley, S.E., Huck, P.M., Payment, P., Gillham, R.W., and Hrudley, R.J., (2002) Walkerton: *Lessons learned in comparison with waterborne outbreaks in the developed world*, Journal Environmental Engineering Science 1: 397-407.

Jackson, S.G., Goodbrand, R.B., Johnson, R.P., Odorico, V.G., Alves, D., Rahn, K., Wilson, J.B., Welch, M.K., and Khakhria, R. (1998) *Escherichia coli* O157:H7 diarrhea associated with well water and infected cattle on an Ontario farm. *Epidemiol. Infect.*, 120: 17–20.

Moe, C.L. (1997) *Waterborne transmission of infectious agents*. In: *Manual of environmental microbiology*. C.J. Hurst, G.R. Knudsen, M.J. McInerney, L.D. Stetzenbach, and M.V. Walter (eds.). ASM Press, Washington, DC.

Rice, E.W. (1999) *Escherichia coli*. In: *AWWA manual M48: Waterborne pathogens*. American Water Works Association, Denver, CO. pp. 75–78.

Swerdlow, D.L., Woodruff, B.A., Brady, R.C., Griffin, P.M., Tippen, S., Donnell, H.D., Jr., Geldreich, E., Payne, B.J., Meyer, A., Jr., Wells, J.G., Greene, K.D., Bright, M., Bean, N.H., and Blake, P.A. (1992) *A waterborne outbreak in Missouri of Escherichia coli* O157:H7 associated with bloody diarrhea and death. *Ann. Intern. Med.*, 17(10): 812–819.

Tilden, J. Jr., Young, W., McNamara, A.M., et al. (1996) *A new route of transmission for Escherichia coli: infection from dry fermented salami*, *American Journal of Public Health*, 1996, 86:1142-45.

USEPA (U.S. Environmental Protection Agency), (2006a). Office of Ground Water and Drinking Water. *E. coli in Drinking Water* (fact sheet). Available: <http://www.epa.gov/safewater/ecoli.html>.

USEPA (U.S. Environmental Protection Agency), (2006b). Office of Ground Water and Drinking Water, *Ground Water Rule: Public Health Concerns*. Available: <http://www.epa.gov/safewater/standard/phs.html>