R309-100. Administration: Drinking Water Program.

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R309-100. Administration: Drinking Water Program.

R309-100-1. Purpose.

The purpose of this rule is to set forth the water quality and drinking water standards for public water systems.

R309-100-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104 of the Utah Code and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-100-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-100-4. General.

These rules shall apply to all public drinking water systems within the State of Utah.

(1) A public drinking water system is a system, either publicly or privately owned, providing water for human consumption and other domestic uses, which:

(a) Has at least 15 service connections,

(i) Delivery of drinking water, such as by a single well, to a portion of a platted subdivision or a portion of a contiguous development, either of which is under the same ownership or control, shall be considered a single public drinking water system; and

(ii) A platted subdivision or other contiguous development of 15 or more lots, under the same ownership or control, is considered to have the corresponding number of connections as there are lots; or

(b) Serves an average of at least 25 individuals daily at least 60 days out of the year.

(i) A ratio of 3.13 persons per connection shall be used to calculate the individuals served unless, at the time of operation, more accurate

information is available. The ratio is based on the statewide average persons per residence in the 2000 census.

(ii) Notwithstanding the threshold for the number of service connections set forth in (a), a drinking water system consisting of at least 8 service connections is considered to serve 25 people, based on the ratio in (b)(i), and consequently is classified as a public drinking water system, unless, at the time of operation, more accurate data can be used.

(iii) The ratio in (b)(i) is only be used to determine whether, prior to construction or modification, any particular water system is considered to be a public water system.

(c) Any person or entity may request a review of the designation of a public water system by submitting documentation to the Director showing that the drinking water system, upon complete build out, falls below both thresholds listed in (a) and (b) above. All decisions made by the Director under this provision may be challenged as provided in Section 19-1-301.5 and R305-7.

(2) Submetered Properties.

(a) Submetered Properties means a billing process by which a property owner (or association of property owners, in the case of co-ops or condominiums) bills tenants based on metered total water use; the property owner is then responsible for payment of a water bill from a public water system.

(b) A property owner who installs submeters to track usage of water by tenants on his or her property shall not be subject to these rules solely as a result of taking the administrative act of submetering and billing.

(c) Owners of submetered properties shall receive all their water from a regulated public water system to qualify under the terms of R309-105-5 for exemption from monitoring requirements, except as to the selling of water.

(d) This is not intended to exempt systems where the property in question has a large distribution system (piping in excess of 500 feet in length and sized larger than the normal service lateral based on a fixture unit analysis) serves a large population or serves a mixed (commercial/residential) population (e.g. many military installations/facilities or large mobile home parks or P.U.D's) from regulation as a public drinking water system as pertains to notifying the Division of the persons indicated below in (5) or plan review of modifications or changes to their systems (refer to R309-500).

(3) The term public drinking water system includes collection, treatment, storage or distribution facilities under control of the operator and used primarily in connection with the system. Additionally, the term includes collection, pretreatment or storage facilities used

primarily in connection with the system but not under such control (see 19-4-102 of the Utah Code Annotated).

(4) Categories of Public Drinking Water Systems

Public drinking water systems are divided into three categories, as follows:

(a) "Community water system" (CWS) means a public drinking water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

(b) "Non-transient, non-community water system" (NTNCWS) means a public water system that is not a community water system and that regularly serves at least 25 of the same nonresident persons over six months per year. Examples of such systems are those serving the same individuals (industrial workers, school children, church members) by means of a separate system.

(c) "Transient non-community water system" (TNCWS) means a non-community public water system that does not serve 25 of the same nonresident persons per day for more than six months per year. Examples of such systems are those, RV park, diner or convenience store where the permanent nonresident staff number less than 25, but the number of people served exceeds 25.

(d) The distinctions between "Community", "Non-transient, non-community", and "Transient Non-community" water systems are important with respect to monitoring and water quality requirements.

(5) Responsibility

(a) All public drinking water systems must have a person or organization designated as the owner of the system. The name, address and phone number of this person or organization shall be supplied, in writing, to the Director.

(b) The name of the person to be contacted on issues concerning the operation and maintenance of the system shall also be provided, in writing, to the Director.

R309-100-5. Approval of Plans and Specifications for Public Water Supply Projects.

(1) The Director must approve, in writing, all engineering plans and specifications for public drinking water projects prior to construction.

(2) Refer to R309-105-6 and/or R309-500-6 for further requirements.

(3) Operating Permits shall be obtained by the public water system prior to placing any public drinking water facility into operation as required in R309-500-9.

R309-100-6. Feasibility Reviews.

(1) Upon the request of the local health department, the Department of Environmental Quality will conduct a review to determine the "feasibility" of adequate water supply for any proposed public water system (e.g. subdivisions, industrial plants or commercial facilities). Information submitted to the Department for consideration must be simultaneously submitted to the local health department. This feasibility review is a preliminary investigation of the proposed method of water supply and is done in conjunction with a review of proposed methods of wastewater disposal.

(2) Refer to the Department of Environmental Quality publication "Review Criteria for Establishing the Feasibility of Proposed Housing Subdivisions" available at the Division of Drinking Water.

R309-100-7. Sanitary Survey, Evaluation, and Corrective Action of Existing Facilities.

(1) The Director, after considering information gathered during sanitary surveys and facility evaluations, may make determinations of regulatory significance including: monitoring reductions or increases, treatment, variances and exemptions.

(2) CONDUCTING SANITARY SURVEYS

(a) The Director shall ensure a sanitary survey is conducted at least every three years on all public water systems. The Director may reduce this frequency to once every five years based on outstanding performance on prior sanitary surveys.

(b) Sanitary surveys conducted by the following individuals under the circumstances as listed, may be used by the Director for the above determinations:

(i) Division of Drinking Water personnel;

(ii) Utah Department of Environmental Quality District Engineers;

(iii) local health officials;

(iv) Forest Service engineers;

(v) Utah Rural Water Association staff;

(vi) consulting engineers; and

(vii) other qualified individuals authorized in writing by the Director.

(3) Public water systems must provide the Director, at the Director's request, any existing information that will enable the State to conduct a sanitary survey.

(4) For the purposes of this subpart, a "sanitary survey", as conducted by the Director, includes but is not limited to, an onsite review of the water source(s) (identifying sources of contamination by using results of source water assessments or other relevant information where available), facilities, equipment, operation, maintenance, and monitoring compliance of a public water system to evaluate the adequacy of the system, its sources and operations and the distribution of safe drinking water.

(5) The sanitary survey must include an evaluation of the applicable components listed in paragraphs (5)(a) through (h) of this section:

(a) Source,

(b) Treatment,

(c) Distribution system,

(d) Finished water storage,

(e) Pumps, pump facilities, and controls,

(f) Monitoring, reporting, and data verification,

(g) System management and operation, and

(h) Operator compliance with State requirements.

(6) CONDITIONS ON CONDUCT OF SANITARY SURVEYS

In order for the groups of individuals listed in R309-100-7(2)(b) to conduct sanitary surveys acceptable for consideration by the Director, the following criteria must be met:

(a) Surveys of all systems involving complete treatment plants must be performed by Division of Drinking Water staff or others authorized in writing by the Director;

(b) Local Health officials may conduct surveys of systems within their respective jurisdictions;

(c) U.S. Forest Service (USFS) engineers may conduct surveys of water systems if the system is owned and operated by the USFS or USFS concessionaires;

(d) Utah Rural Water Association staff may conduct surveys of water systems if the system's population is less than 10,000;

(e) Consulting Engineers under the direction of a Registered Professional Engineer;

(f) Other qualified individuals who are authorized in writing by the Director may conduct surveys.

(7) SANITARY SURVEY REPORT CONTENT

The Director will prescribe the form and content of sanitary survey reports and be empowered to reject all or part of unacceptable reports.

(8) ACCESS TO WATER FACILITIES

Department of Environmental Quality employees after reasonable notice and presentation of credentials, may enter any part of a public water system at reasonable times to inspect the facilities and water quality records, conduct sanitary surveys, take samples and otherwise evaluate compliance with Utah's drinking water rules. All others who have been authorized by the Director to conduct sanitary surveys must have the permission of the water system owner or designated representative before a sanitary survey may be conducted.

(9) CORRECTIVE ACTION

Public water systems must comply with requirements found in R309-215-16(3)(a)(iii), R309-215-16(3)(a)(iv), R309-215-16(3)(a)(v), R309-215-16(3)(a)(vi), and R309-215-16(3)(a)(vii).

(10) Refer to R309-100-8 and R309-105-6 for further requirements.

R309-100-8. Rating System.

The Director shall assign a rating to each public water supply in order to provide a concise indication of its condition and performance. The criteria to be used for determining a water system's rating shall be as set forth in R309-400.

R309-100-9. Orders and Emergency Actions.

(1) In situations in which a public water system fails to meet the requirements of these rules, the Director may issue an order to a water supplier to take appropriate protective or corrective measures.

(2) Failure to comply with these rules or with an order issued by the Director may result in the imposition of penalties as provided in the Utah Safe Drinking Water Act.

(3) The Director may respond to emergency situations involving public drinking water, including emergency situations as described in R309-105-18, in a manner appropriate to protect the public health. The Director's response may include the following:

(a) Issuing press releases to inform the public of any confirmed or possible hazards in their drinking water.

(b) Ordering water suppliers to take appropriate measures to protect public health, including issuance of orders pursuant to 63G-4-502, if warranted.

R309-100-10. Variances.

(1) Variances to the requirements of R309-200 of these rules may be granted by the Board to water systems which, because of characteristics of their raw water sources, cannot meet the required maximum contaminant levels despite the application of best technology and treatment techniques available (taking costs into consideration).

(2) The variance will be granted only if doing so will not result in an unreasonable risk to health.

(3) No variance from the maximum contaminant level for total coliforms are permitted.

(4) No variance from the minimum filtration and disinfection requirements of R309-525 and R309-530 will be permitted for sources classified by the Director as directly influenced by surface water.

(6) Within one year of the date any variance is granted, the Board shall prescribe a schedule by which the water system will come into compliance with the maximum contaminant level in question. The requirements of Section 1415 of the Federal Safe Drinking Water Act, PL 104-182, are hereby incorporated by reference. The Board shall provide notice and opportunity for public hearing prior to granting any variance or determining the compliance schedule. Procedures for giving notice and opportunity for hearing will be as outlined in 40 CFR Section 142.44.

R309-100-11. Exemptions.

(1) The Board may grant an exemption from the requirements of R309-200 or from any required treatment technique if:

(a) Due to compelling factors (which may include economic factors), the public water system is unable to comply with contaminant level or treatment technique requirements, and

(b) The public water system was in operation on the effective date of such contaminant level or treatment technique requirement, and

(c) The granting of the exemption will not result in an unreasonable risk to health.

(2) No exemptions from the maximum contaminant level for total coliforms are permitted.

(3) No exemptions from the minimum disinfection requirements of R309-200-5(7) will be permitted for sources classified by the Director as directly influenced by surface water.

(4) Within one year of the granting of an exemption, the Board shall prescribe a schedule by which the water system will come into compliance with contaminant level or treatment technique requirement. The requirements of Section 1416 of the Federal Safe Drinking Water Act, PL 104-182, are hereby incorporated by reference.

(5) The Board shall provide notice and opportunity for an exemption hearing as provided in 40 CFR Section 142.54.

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R309-105. Administration: General Responsibilities of Public Water Systems.

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R309-105. Administration: General Responsibilities of Public Water Systems.

R309-105-1. Purpose.

The purpose of this rule is to set forth the general responsibilities of public water systems, water system owners and operators.

R309-105-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104 of the Utah Code and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-105-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-105-4. General.

Water suppliers are responsible for the quality of water delivered to their customers. In order to give the public reasonable assurance that the water which they are consuming is satisfactory, the Board has established rules for the design, construction, water quality, water treatment, contaminant monitoring, source protection, operation and maintenance of public water supplies.

R309-105-5. Exemptions from Monitoring Requirements.

(1) The applicable requirements specified in R309-205, R309-210 and R309-215 for monitoring shall apply to each public water system, unless the public water system meets all of the following conditions:

(a) Consists only of distribution and storage facilities (and does not have any collection and treatment facilities);

(b) Obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply;

(c) Does not sell water to any person; and

(d) Is not a carrier which conveys passengers in interstate commerce.

(2) When a public water system supplies water to one or more other public water systems, the Executive Secretary may modify the monitoring requirements imposed by R309-205, R309-210 and R309-215 to the extent that the interconnection of the systems justifies treating them as a single system for monitoring purposes.

(3) In no event shall the Executive Secretary authorize modifications in the monitoring requirements which are less stringent than requirements established by the Federal Safe Drinking Water Act.

R309-105-6. Construction of Public Drinking Water Facilities.

The following requirements pertain to the construction of public water systems.

(1) Approval of Engineering Plans and Specifications

(a) Complete plans and specifications for all public drinking water projects, as described in R309-500-5, shall be approved in writing by the Executive Secretary prior to the commencement of construction. A 30-day review time should be assumed.

(b) Appropriate engineering reports, supporting information and master plans may also be required by the Executive Secretary as needed to evaluate the proposed project. A certificate of convenience and necessity or an exemption therefrom, issued by the Public Service Commission, shall be filed with the Executive Secretary prior to approval of any plans or specifications for projects described in R309-500-4(1) as new or previously un-reviewed water system.

(2) Acceptable Design and Construction Methods

(a) The design and construction methods of all public drinking water facilities shall conform to the applicable standards contained in R309-500 through R309-550 of these rules. The Executive Secretary may require modifications to plans and specifications before approval is granted.

(b) There may be times in which the requirements of the applicable standards contained in R309-500 through R309-550 are not appropriate. Thus, the Executive Secretary may grant an "exception" to portions of these standards if it can be shown that the granting of such an exception will not jeopardize the public health. In order for the Executive Secretary to consider such a request, the Division asks that it

receive a written request directly from the management of the public dinking water system, preferably on system letterhead, that includes the following:

(i) citation of the specific rule for which the "exception" is being requested;

(ii) a detailed explanation, drawings may be included, of why the conditions of rule cannot be met;

(iii) what the system proposes, drawings may be included, in lieu of rule;

(iv) justification the proposed alternative will protect the public health to a similar or better degree than required by rule.

Physical conditions as well as cost may be justification for requesting an "exception-to-rule."

(c) Alternative or new treatment techniques may be developed which are not specifically addressed by the applicable standards contained in R309-500 through R309-550. These treatment techniques may be accepted by the Executive Secretary if it can be shown that:

(i) They will result in a finished water meeting the requirements of R309-200 of these regulations.

(ii) The technique will produce finished water which will protect public health to the same extent provided by comparable treatment processes outlined in the applicable standards contained in R309-204 and R309-500 through R309-550.

(iii) The technique is as reliable as any comparable treatment process governed by the applicable standards contained in R309-204 and R309-500 through R309-550.

(3) Description of "Public Drinking Water Project"

Refer to R309-500-5 for the description of a public drinking water project and R309-500-6 for required items to be submitted for plan approval.

(4) Specifications for the drilling of a public water supply well

may be prepared and submitted by a licensed well driller holding a current Utah Well Driller's Permit if authorized by the Executive Secretary.

(5) Drawing Quality and Size

Drawings which are submitted shall be compatible with Division of Drinking Water Document storage. Drawings which are illegible or of unusual size will not be accepted for review. Drawing size shall not exceed 30" x 42" nor be less than 8-1/2" x 11".

(6) Requirements After Approval of Plans for Construction

After the approval of plans for construction, and prior to operation of any facilities dealing with drinking water, the items required by R309-500-9 shall be submitted and an operating permit received.

R309-105-7. Source Protection.

(1) Public Water Systems are responsible for protecting their sources of drinking water from contamination. R309-600 and R309-605 sets forth minimum requirements to establish a uniform, statewide program for implementation by PWSs to protect their sources of drinking water. PWSs are encouraged to enact more stringent programs to protect their sources of drinking water if they decide they are necessary.

(2) R309-600 applies to ground-water sources and to ground-water sources which are under the direct influence of surface water which are used by PWSs to supply their systems with drinking water.

(3) R309-605 applies to PWSs which obtain surface water prior to treatment and distribution and to PWSs obtaining water from ground-water sources which are under the direct influence of surface water. However, compliance with this rule is voluntary for public transient non-community water systems to the extent that they are using existing surface water sources of drinking water.

R309-105-8. Existing Water System Facilities.

(1) All public water systems shall deliver water meeting the applicable requirements of R309-200 of these rules.

(2) Existing facilities shall be brought into compliance with R309-500 through R309-550 or shall be reliably capable of delivering water meeting the requirements of R309-200.

(3) In situations where a water system is providing water of unsatisfactory quality, or when the quality of the water or the public health is threatened by poor physical facilities, the water system management shall solve the problem(s).

R309-105-9. Minimum Water Pressure.

(1) Unless otherwise specifically approved by the Executive Secretary, no water supplier shall allow any connection to the water system where the dynamic water pressure at the point of connection will fall below 20 psi during the normal operation of the water system. Water systems approved prior to January 1, 2007, are required to maintain the above minimum dynamic water pressure at all locations within their distribution system. Existing public drinking water systems, approved prior to January 1, 2007, which expand their service into new areas or supply new subdivisions shall meet the minimum dynamic water pressure requirements in R309-105-9(2) at any point of connection in the new service areas or new subdivisions.

(2) Unless otherwise specifically approved by the Executive Secretary, new public drinking water systems constructed after January 1, 2007 shall be designed and shall meet the following minimum water pressures at points of connection:

(a) 20 psi during conditions of fire flow and fire demand experienced during peak day demand;

(b) 30 psi during peak instantaneous demand; and

(c) 40 psi during peak day demand.

(3) Individual home booster pumps are not allowed as indicated in R309-540-5(4)(c).

R309-105-10. Operation and Maintenance Procedures.

All routine operation and maintenance of public water supplies shall be carried out with due regard for public health and safety. The following sections describe procedures which shall be used in carrying out some common operation and maintenance procedures.

(1) Chemical Addition

(a) Water system operators shall determine that all chemicals added to water intended for human consumption are suitable for potable water use and comply with ANSI/NSF Standard 60.

(b) No chemicals or other substances shall be added to public water supplies unless the chemical addition facilities and chemical type have been reviewed and approved by the Division of Drinking Water.

(c) Chlorine, when used in the distribution system, shall be added in sufficient quantity to achieve either "breakpoint" and yield a detectable free chlorine residual or a detectable combined chlorine residual in the distribution system at points to be

determined by the Executive Secretary. Residual checks shall be taken a minimum of three times each week by the operator of any system using disinfectants. The Executive Secretary may, however, reduce the frequency of residual checks if he determines that this would be an unwarranted hardship on the water system operator and, furthermore, the disinfection equipment has a verified record of reliable operation. Suppliers, when checking for residuals, shall use test kits and methods which meet the requirements of the U.S. EPA. The "DPD" test method is recommended for free chlorine residuals. Information on the suppliers of this equipment is available from the Division of Drinking Water.

(2) New and Repaired Mains

(a) All new water mains shall meet the requirements of R309-550-6 with regard to materials of construction. All products in contact with culinary water shall comply with ANSI/NSF Standard 61.

(b) All new and repaired water mains or appurtenances shall be disinfected in accordance with AWWA Standard C651-92. The chlorine solution shall be flushed from the water main with potable water prior to the main being placed in use.

(c) All products used to recoat the interiors of storage structures and which may come in contact with culinary water shall comply with ANSI/NSF Standard 61.

(3) Reservoir Maintenance and Disinfection

After a reservoir has been entered for maintenance or re-coating, it shall be disinfected prior to being placed into service. Procedures given in AWWA Standard C651-92 shall be followed in this regard.

(4) Spring Collection Area Maintenance

(a) Spring collection areas shall be periodically cleared of deep rooted vegetation to prevent root growth from clogging collection lines. Frequent hand or mechanical clearing of spring collection areas is strongly recommended. It is advantageous to encourage the growth of grasses and other shallow rooted vegetation for erosion control and to inhibit the growth of more detrimental flora.

(b) No pesticide (e.g., herbicide) may be applied on a spring collection area without the prior written approval of the Executive Secretary. Such approval shall be given 1) only when acceptable pesticides are proposed; 2) when the pesticide product manufacturer certifies that no harmful substance will be imparted to the water; and 3) only when spring development meets the requirements of these rules (see R309-515-7).

(5) Security

All water system facilities such as spring junction boxes, well houses, reservoirs, and treatment facilities shall be secure.

(6) Seasonal Operation

Water systems operated seasonally shall be disinfected and flushed according to the techniques given in AWWA Standard C651-92 and C652-92 prior to each season's use. A satisfactory bacteriologic sample shall be achieved prior to use. During the non-use period, care shall be taken to close all openings into the system.

(7) Pump Lubricants

All oil lubricated pumps for culinary wells shall utilize mineral oils suitable for human consumption as determined by the Executive Secretary. To assure proper performance, and to prevent the voiding of any warranties which may be in force, the water supplier should confirm with individual pump manufacturers that the oil which is selected will have the necessary properties to perform satisfactorily.

R309-105-11. Operator Certification.

All community and non-transient non-community water systems or any public system that employs treatment techniques for surface water or ground water under the direct influence of surface water shall have an appropriately certified operator in accordance with the requirements of these rules. Refer to R309-300, Certification Rules for Water Supply Operators, for specific requirements.

R309-105-12. Cross Connection Control.

(1) The water supplier shall not allow a connection to his system which may jeopardize its quality and integrity. Cross connections are not allowed unless controlled by an approved and properly operating backflow prevention assembly. The requirements of Chapter 6 of the 2009 International Plumbing Code and its amendments as adopted by the Department of Commerce under R156-56 shall be met with respect to cross connection control and backflow prevention.

(2) Each water system shall have a functioning cross connection control program. The program shall consist of five designated elements documented on an annual basis. The elements are:

(a) a legally adopted and functional local authority to enforce a cross connection control program (i.e., ordinance, bylaw or policy);

(b) providing public education or awareness material or presentations;

(c) an operator with adequate training in the area of cross connection control or backflow prevention;

(d) written records of cross connection control activities, such as, backflow assembly inventory; and

(e) test history and documentation of on-going enforcement (hazard assessments and enforcement actions) activities.

(3) Suppliers shall maintain, as proper documentation, an inventory of each pressure atmospheric vacuum breaker, double check valve, reduced pressure zone principle assembly, and high hazard air gap used by their customers, and a service record for each such assembly.

(4) Backflow prevention assemblies shall be inspected and tested at least once a year, by an individual certified for such work as specified in R309-305. Suppliers shall maintain, as proper documentation, records of these inspections. This testing responsibility may be borne by the water system or the water system management may require that the customer having the backflow prevention assembly be responsible for having the device tested.

(5) Suppliers serving areas also served by a pressurized irrigation system shall prevent cross connections between the two. Requirements for pressurized irrigation systems are outlined in Section 19-4-112 of the Utah Code.

R309-105-13. Finished Water Quality.

All public water systems are required to monitor their water according to the requirements of R309-205, R309-210 and R309-215 to determine if the water quality standards of R309-200 have been met. Water systems are also required to keep records and, under certain circumstances, give public notice as required in R309-220.

R309-105-14. Operational Reports.

(1) Written Operational Reports.

(a) If, in the opinion of the Executive Secretary, a water system is not properly operated, the Executive Secretary may require a public water system to submit a

written operational report covering the operation of the whole or a part of the water system's infrastructure.

(b) The Executive Secretary may require revisions to the submitted operational report to ensure satisfactory operation, and may order the water system to follow the operational report.

(c) If the water system fails to implement the provisions of the operational report, as evidenced by unsatisfactory delivery of a safe and/or reliable supply of drinking water, the Executive Secretary may order further remedies as deemed necessary.

(2) Treatment techniques for acrylamide and epichlorohydrin.

(a) Each public water system shall certify annually in writing to the Executive Secretary (using third party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified in R309-215-8(2)(c).

(b) Certifications may rely on manufacturer's data.

(3) (a) All water systems using chemical addition or specialized equipment for the treatment of drinking water shall regularly complete operational reports. This information shall be evaluated to confirm that the treatment process is being done properly, resulting in successful treatment.

(b) The information to be provided, and the frequency at which it is to be gathered and reported, will be determined by the Executive Secretary.

R309-105-15. Annual Reports.

All community water systems shall be required to complete annual report forms furnished by the Division of Drinking Water. The information to be provided should include: the status of all water system projects started during the previous year; water demands met by the system; problems experienced; and anticipated projects.

R309-105-16. Reporting Test Results.

(1) If analyses are made by certified laboratories other than the state laboratory, these results shall be forwarded to the Division as follows:

(a) The supplier shall report to the Division the analysis of water samples which fail to comply with the Primary Drinking Water Standards of R309-200. Except where a different reporting period is specified in R309-205, R309-210 or R309-215, this

report shall be submitted within 48 hours after the supplier receives the report from his lab. The Division may be reached at (801)536-4200.

(b) Monthly summaries of bacteriologic results shall be submitted within ten days following the end of each month.

(c) All results of TTHM samples shall be reported to the Division within 10 days of receipt of analysis for systems monitoring pursuant to R309-210-9.

(d) For all samples other than samples showing unacceptable results, bacteriologic samples or TTHM samples, the time between the receipt of the analysis and the reporting of the results to the Division shall not exceed 40 days.

(e) Arsenic sampling results shall be reported to the nearest 0.001 mg/L.

(f) There are additional reporting requirements in other sections of the rules, see R309-215-16(5).

(2) Disinfection byproducts, maximum residual disinfectant levels and disinfection byproduct precursors and enhanced coagulation or enhanced softening. This section applies to the reporting requirements of R309-210-8, R309-215-12 and R309-215-13. For the reporting requirements of R309-210-9, R309-210-10 and R309-215-15 are contained within R309-210-9, R309-210-10 and R309-215-15, respectively.

(a) Systems required to sample quarterly or more frequently shall report to the State within 10 days after the end of each quarter in which samples were collected. Systems required to sample less frequently than quarterly shall report to the State within 10 days after the end of each monitoring period in which samples were collected. The Executive Secretary may choose to perform calculations and determine whether the MCL was exceeded, in lieu of having the system report that information.

(b) Disinfection byproducts. Systems shall report the information specified.

(i) Systems monitoring for TTHMs and HAA5 under the requirements of R309-210-8(2) on a quarterly or more frequent basis shall report:

(A) The number of samples taken during the last quarter.

(B) The location, date, and result of each sample taken during the last quarter.

(C) The arithmetic average of all samples taken in the last quarter.

(D) The annual arithmetic average of the quarterly arithmetic averages of this section for the last four quarters.

(E) Whether, based on R309-210-8(6)(b)(i), the MCL was violated.

(ii) Systems monitoring for TTHMs and HAA5 under the requirements of R309-210-8(2) less frequently than quarterly (but at least annually) shall report:

(A) The number of samples taken during the last year.

(B) The location, date, and result of each sample taken during the last monitoring period.

(C) The arithmetic average of all samples taken over the last year.

(D) Whether, based on R309-210-8(6)(b)(i), the MCL was violated.

(iii) Systems monitoring for TTHMs and HAA5 under the requirements of R309-210-8(2) less frequently than annually shall report:

(A) The location, date, and result of the last sample taken.

(B) Whether, based on R309-210-8(6)(b)(i), the MCL was violated.

(iv) Systems monitoring for chlorite under the requirements of R309-210-8(2) shall report:

(A) The number of entry point samples taken each month for the last 3 months.

(B) The location, date, and result of each sample (both entry point and distribution system) taken during the last quarter.

(C) For each month in the reporting period, the arithmetic average of all samples taken in each three sample set taken in the distribution system.

(D) Whether, based on R309-210-8(6)(b)(ii), the MCL was violated.

(v) System monitoring for bromate under the requirements of R309-210-8(2) shall report:

(A) The number of samples taken during the last quarter.

(B) The location, date, and result of each sample taken during the last quarter.

(C) The arithmetic average of the monthly arithmetic averages of all samples taken in the last year.

(D) Whether, based on R309-210-8(6)(b)(iii), the MCL was violated.

(c) Disinfectants. Systems shall report the information specified to the Executive Secretary within ten days after the end of each month the system serves water to the public, except as otherwise noted:

(i) Systems monitoring for chlorine or chloramines under the requirements of R309-210-8(3)(a) shall report and certify, by signing the report form provided by the Executive Secretary, that all the information provided is accurate and correct and that any chemical introduced into the drinking water complies with ANSI/NSF Standard 60:

(A) The number of samples taken during each month of the last quarter.

(B) The monthly arithmetic average of all samples taken in each month for the last 12 months.

(C) The arithmetic average of all monthly averages for the last 12 months.

(D) The additional data required in R309-210-8(3)(a)(ii).

(E) Whether, based on R309-210-8(6)(c)(i), the MRDL was violated.

(ii) Systems monitoring for chlorine dioxide under the requirements of R309-210-8(3) shall report:

(A) The dates, results, and locations of samples taken during the last quarter.

(B) Whether, based on R309-210-8(6)(c)(ii), the MRDL was violated.

(C) Whether the MRDL was exceeded in any two consecutive daily samples and whether the resulting violation was acute or nonacute.

(d) Disinfection byproduct precursors and enhanced coagulation or enhanced softening. Systems shall report the information specified.

(i) Systems monitoring monthly or quarterly for TOC under the requirements of R309-215-12 and required to meet the enhanced coagulation or enhanced softening requirements in R309-215-13(2)(b) or (c) shall report:

(A) The number of paired (source water and treated water) samples taken during the last quarter.

(B) The location, date, and results of each paired sample and associated alkalinity taken during the last quarter.

(C) For each month in the reporting period that paired samples were taken, the arithmetic average of the percent reduction of TOC for each paired sample and the required TOC percent removal.

(D) Calculations for determining compliance with the TOC percent removal requirements, as provided in R309-215-13(3)(a).

(E) Whether the system is in compliance with the enhanced coagulation or enhanced softening percent removal requirements in R309-215-13(2) for the last four quarters.

(ii) Systems monitoring monthly or quarterly for TOC under the requirements of R309-215-12 and meeting one or more of the alternative compliance criteria in R309-215-13(1)(b) or (c) shall report:

(A) The alternative compliance criterion that the system is using.

(B) The number of paired samples taken during the last quarter.

(C) The location, date, and result of each paired sample and associated alkalinity taken during the last quarter.

(D) The running annual arithmetic average based on monthly averages (or quarterly samples) of source water TOC for systems meeting a criterion in R309-215-13(1)(b)(i) or (iii) or of treated water TOC for systems meeting the criterion in R309-215-13(1)(b)(ii).

(E) The running annual arithmetic average based on monthly averages (or quarterly samples) of source water SUVA for systems meeting the criterion in R309-215-13(1)(b)(v) or of treated water SUVA for systems meeting the criterion in R309-215-13(1)(b)(vi).

(F) The running annual average of source water alkalinity for systems meeting the criterion in R309-215-13(1)(b)(iii) and of treated water alkalinity for systems meeting the criterion in R309-215-13(1)(c)(i).

(G) The running annual average for both TTHM and HAA5 for systems meeting the criterion in R309-215-13(1)(b)(iii) or (iv).

(H) The running annual average of the amount of magnesium hardness removal (as $CaCO_3$, in mg/L) for systems meeting the criterion in R309-215-13(1)(c)(ii).

(I) Whether the system is in compliance with the particular alternative compliance criterion in R309-215-13(1)(b) or (c).

(3) The public water system, within 10 days of completing the public notification requirements under R309-220 for the initial public notice and any repeat notices, shall submit to the Division a certification that it has fully complied with the public notification regulations. The public water system shall include with this certification a representative copy of each type of notice distributed, published, posted, and made available to the persons served by the system and to the media.

(4) All samples taken in accordance with R309-215-6 shall be submitted within 10 days following the end of the operational period specified for that particular treatment. Finished water samples results for the contaminant of concern that exceed the Primary Drinking Water Standards of R309-200, shall be reported to the Division within 48 hours after the supplier receives the report. The Division may be reached at (801) 536-4000.

(5) Documentation of operation and maintenance for point-of-use or point-of-entry treatment units shall be provided to the Division annually. The Division shall receive the documentation by January 31 annually.

R309-105-17. Record Maintenance.

All public water systems shall retain on their premises or at convenient location near their premises the following records:

(1) Records of microbiological analyses and turbidity analyses made pursuant to this Section shall be kept for not less than five years. Records of chemical analyses made pursuant to this Section shall be kept for not less than ten years. Actual laboratory reports may be kept, or data may be transferred to tabular summaries, provided that the following information is included:

(a) The date, place and time of sampling, and the name of the person who collected the sample;

(b) Identification of the sample as to whether it was a routine distribution system sample, check sample, raw or process water sample or other special purpose sample.

(c) Date of analysis;

(d) Laboratory and person responsible for performing analysis;

(e) The analytical technique/method used; and

(f) The results of the analysis.

(2) Lead and copper recordkeeping requirements.

(a) Any water system subject to the requirements of R309-210-6 shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, Executive Secretary determinations, and any other information required by R309-210-6.

(b) Each water system shall retain the records required by this section for no fewer than 12 years.

(3) Records of action taken by the system to correct violations of primary drinking water regulations shall be kept for a period not less than three years after the last action taken with respect to the particular violation involved.

(4) Copies of any written reports, summaries or communications relating to sanitary surveys of the system conducted by the system itself, by a private consultant, or by any local, State or Federal agency, shall be kept for a period not less than ten years after completion of the sanitary survey involved.

(5) Records concerning a variance or exemption granted to the system shall be kept for a period ending not less than five years following the expiration of such variance or exemption.

(6) Records that concern the tests of a backflow prevention assembly and location shall be kept by the system for a minimum of not less than five years from the date of the test.

(7) Copies of public notices issued pursuant to R309-220 and certifications made to the Executive Secretary agency pursuant to R309-105-16 shall be kept for three years after issuance.

(8) Copies of monitoring plans developed pursuant to these rules shall be kept for the same period of time as the records of analyses taken under the plan are required to be kept under R309-105-17(1), except as otherwise specified. In all cases the monitoring plans shall be kept as long as the any associated report.

(9) A water system must retain a complete copy of your IDSE report submitted under this section for 10 years after the date that you submitted your IDSE report. If the Executive Secretary modifies the R309-210-10 monitoring requirements that you recommended in your IDSE report or if the Executive Secretary approves alternative monitoring locations, you must keep a copy of the Executive Secretary's notification on file for 10 years after the date of the Executive Secretary's notification. You must make the IDSE report and any

Executive Secretary notification available for review by the Executive Secretary or the public.

(10) A water system must retain a complete copy of its 40/30 certification submitted under this R309-210-9 for 10 years after the date that you submitted your certification. You must make the certification, all data upon which the certification is based, and any Executive Secretary notification available for review by the Executive Secretary or the public.

(11) A water subject to the disinfection profiling requirements of R309-215-14 shall keep must keep results of profile (raw data and analysis) indefinitely.

(12) A water system subject to the disinfection benchmarking requirements of R309-215-14 shall keep must keep results of profile (raw data and analysis) indefinitely.

R309-105-18. Emergencies.

(1) The Executive Secretary or the local health department shall be informed by telephone by a water supplier of any "emergency situation". The term "emergency situation" includes the following:

(a) The malfunction of any disinfection facility such that a detectable residual cannot be maintained at all points in the distribution system.

(b) The malfunction of any "complete" treatment plant such that a clearwell effluent turbidity greater than 5 NTU is maintained longer than fifteen minutes.

(c) Muddy or discolored water (which cannot be explained by air entrainment or re-suspension of sediments normally deposited within the distribution system) is experienced by a significant number of individuals on a system.

(d) An accident has occurred which has, or could have, permitted the entry of untreated surface water and/or other contamination into the system (e.g. break in an unpressurized transmission line, flooded spring area, chemical spill, etc.)

(e) A threat of sabotage has been received by the water supplier or there is evidence of vandalism or sabotage to any public drinking water supply facility which may affect the quality of the delivered water.

(f) Any instance where a consumer reports becoming sick by drinking from a public water supply and the illness is substantiated by a doctor's diagnosis (unsubstantiated claims should also be reported to the Division of Drinking Water, but this is not required).

(2) If an emergency situation exists, the water supplier shall then contact the Division in Salt Lake City within eight hours. Division personnel may be reached at all times through 801-536-4123.

(3) All suppliers are advised to develop contingency plans to cope with possible emergency situations. In many areas of the state the possibility of earthquake damage shall be realistically considered.

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R309-110. Administration: Definitions.

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R309-110. Administration: Definitions.

R309-110-1. Purpose.

The purpose of this rule is to define certain terms and expressions that are utilized throughout all rules under R309. Collectively, those rules govern the administration, monitoring, operation and maintenance of public drinking water systems as well as the design and construction of facilities within said systems.

R309-110-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104 of the Utah Code and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-110-3. Acronyms.

As used in R309:

"AF" means Acre Foot.

"AWOP" means Area Wide Optimization Program.

"AWWA" means American Water Works Association.

"BAT" means Best Available Technology.

"C" means Residual Disinfectant Concentration.

"CCP" means Composite Correction Program.

"CCR" means Consumer Confidence Report.

"CEU" means Continuing Education Unit.

"CFE" means Combined Filter Effluent.

"CFR" means Code of Federal Regulations.

"cfs" means Cubic Feet Per Second.

"CPE" means Comprehensive Performance Evaluation.

"CT" means Residual Concentration multiplied by Contact Time.

"CTA" means Comprehensive Technical Assistance.

"CWS" means Community Water System.

"DBPs" means Disinfection Byproducts.

"DE" means Diatomaceous Earth.

"DTF" means Data Transfer Format.

"DWSP" means Drinking Water Source Protection.

"EP" means Entry Point.

"EPA" means Environmental Protection Agency.

"ERC" means Equivalent Residential Connection.

"FBRR" means Filter Backwash Recycling Rule.

"fps" means Feet Per Second

"FR" means Federal Register.

"gpd" means Gallons Per Day.

"gpm" means Gallons Per Minute.

"gpm/sf" means Gallons Per Minute Per Square Foot.

"GWR" means Ground Water Rule.

"GWUDI" means Ground Water Under Direct Influence of Surface Water.

"HAA5s" means Haloacetic Acids (Five).

"HPC" means Heterotrophic Plate Count.

"ICR" means Information Collection Rule of 40 CRF 141 subpart M.

"IESWTR" means Interim Enhanced Surface Water Treatment Rule.

"IFE" means Individual Filter Effluent.

"LT1ESWTR" means Long Term 1 Enhanced Surface Water Treatment Rule.

"LT2ESWTR" means Long Term 2 Enhanced Surface Water Treatment Rule.

"MCL" means Maximum Contaminant Level.

"MCLG" means Maximum Contaminant Level Goal.

"M and R" means Monitoring and Reporting.

"MDBP" means Microbial-Disinfection Byproducts.

"M/DBP Cluster" means Microbial-Disinfectants/Disinfection Byproducts Cluster.

"MG" means Million Gallons.

"MGD" means Million Gallons Per Day.

"mg/L" means Milligrams Per Liter

"MRDL" means Maximum Residual Disinfectant Level.

"MRDLG" means Maximum Residual Disinfectant Level Goal.

"NCWS" means Non-Community Water System.

"NTNC" means Non-Transient Non-Community.

"NTU" means Nephelometric Turbidity Unit.

"PN" means Public Notification.

"POE" means Point-of-Entry.

"POU" means Point-of-Use.

"PWS" means Public Water System.

"PWS-ID" means Public Water System Identification Number.

"RTC" means Return to Compliance.

"SDWA" means Safe Drinking Water Act.

"SDWIS/FED" means Safe Drinking Water Information System/Federal Version.

"SDWIS/STATE" means Safe Drinking Water Information System/State Version.

"SNC" means Significant Non-Compliance.

"Stage 1 DBPR" means Stage 1 Disinfectants and Disinfection Byproducts Rule.

"Stage 2 DBPR" means Stage 2 Disinfectants and Disinfection Byproducts Rule.

"Subpart H" means A PWS using SW or GWUDI.

"Subpart P" means A PWS using SW or GWUDI and serving at least 10,000 people.

"Subpart S" means Provisions of 40 CRF 141 subpart S commonly referred to as the Information Collection Rule.

"Subpart T" means A PWS using SW or GWUDI and serving less than 10,000 people.

"SUVA" means Specific Ultraviolet Absorption.

"SW" means Surface Water.

"SWAP" means Source Water Assessment Program.

"SWTR" means Surface Water Treatment Rule.

"T" means Contact Time.

"TA" means Technical Assistance.

"TCR" means Total Coliform Rule.

"TNCWS" means Transient Non-Community Water System.

"TNTC" means Too Numerous To Count.

"TOC" means Total Organic Carbon.

"TT" means Treatment Technique.

"TTHM" means Total Trihalomethanes.

"UAC" means Utah Administrative Code.

"UPDWR" means Utah Public Drinking Water Rules (R309 of the UAC).

"WCP" means Watershed Control Program.

"WHP" means Wellhead Protection.

R309-110-4. Definitions.

As used in R309:

"Action Level" means the concentration of lead or copper in drinking water tap samples (0.015 mg/l for lead and 1.3 mg/l for copper) which determines, in some cases, the corrosion treatment, public education and lead line replacement requirements that a water system is required to complete.

"AF" means acre foot and is the volume of water required to cover an acre to a depth of one foot (one AF is equivalent to 325,851 gallons).

"Air gap" The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, catch basin, plumbing fixture or other device and the flood level rim of the receptacle. This distance shall be two times the diameter of the effective opening for openings greater than one inch in diameter where walls or obstructions are spaced from the nearest inside edge of the pipe opening a distance greater than three times the diameter of the effective openings for a single wall, or a distance greater than four times the diameter of the effective opening for two intersecting walls. This distance shall be three times the diameter of the effective opening where walls or obstructions are closer than the distances indicated above.

"ANSI/NSF" refers to the American National Standards Institute and NSF International. NSF International has prepared at least two health effect standards dealing with treatment chemicals added to drinking water and system components that will come into contact with drinking water, these being Standard 60 and Standard 61. The American National Standards Institute acts as a certifying agency, and determines which laboratories may certify to these standards.

"Approval" unless indicated otherwise, shall be taken to mean a written statement of acceptance from the Director.

"Approved" refers to a rating placed on a system by the Division and means that the public water system is operating in substantial compliance with all the Rules of R309.

"Average Yearly Demand" means the amount of water delivered to consumers by a public water system during a typical year, generally expressed in MG or AF.

"AWWA" refers to the American Water Works Association located at 6666 West Quincy Avenue, Denver, Colorado 80235. Reference within these rules is generally to a particular

Standard prepared by AWWA and which has completed the ANSI approval process such as ANSI/AWWA Standard C651-92 (AWWA Standard for Disinfecting Water Mains).

"Backflow" means the undesirable reversal of flow of water or mixtures of water and other liquids, gases, or other substances into the distribution pipes of the potable water supply from any source. Also see backsiphonage, backpressure and cross-connection.

"Backpressure" means the phenomena that occurs when the customer's pressure is higher than the supply pressure, This could be caused by an unprotected cross connection between a drinking water supply and a pressurized irrigation system, a boiler, a pressurized industrial process, elevation differences, air or steam pressure, use of booster pumps or any other source of pressure. Also see backflow, backsiphonage and cross connection.

"Backsiphonage" means a form of backflow due to a reduction in system pressure which causes a subatmospheric or negative pressure to exist at a site or point in the water system. Also see backflow and cross-connection.

"Bag Filters" are pressure-driven separation devices that remove particle matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed of a non-rigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to outside.

"Bank Filtration" is a water treatment process that uses a well to recover surface water that has naturally infiltrated into ground water through a river bed or bank(s). Infiltration is typically enhanced by the hydraulic gradient imposed by a nearby pumping water supply or other well(s).

"Best Available Technology" (BAT) means the best technology, treatment techniques, or other means which the Director finds, after examination under field conditions and not solely under laboratory conditions, are available (taking cost into consideration). For the purposes of setting MCLs for synthetic organic chemicals, any BAT must be at least as effective as granular activated carbon for all these chemicals except vinyl chloride. Central treatment using packed tower aeration is also identified as BAT for synthetic organic chemicals.

"Board" means the Drinking Water Board.

"Body Politic" means the State or its agencies or any political subdivision of the State to include a county, city, town, improvement district, taxing district or any other governmental subdivision or public corporation fo the State.

"Breakpoint Chlorination" means addition of chlorine to water until the chlorine demand has been satisfied. At this point, further addition of chlorine will result in a free residual chlorine that is directly proportional to the amount of chlorine added beyond the breakpoint.

"C" is short for "Residual Disinfectant Concentration."

"Capacity Development" means technical, managerial, and financial capabilities of the water system to plan for, achieve, and maintain compliance with applicable drinking water standards.

"Cartridge filters" are pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed as rigid or semi-rigid, self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.

"cfs" means cubic feet per second and is one way of expressing flowrate (one cfs is equivalent to 448.8 gpm).

"Class" means the level of certification of Backflow Prevention Technician (Class I, II or III).

"Coagulation" is the process of destabilization of the charge (predominantly negative) on particulates and colloids suspended in water. Destabilization lessens the repelling character of particulates and colloids and allows them to become attached to other particles so that they may be removed in subsequent processes. The particulates in raw waters (which contribute to color and turbidity) are mainly clays, silt, viruses, bacteria, fulvic and humic acids, minerals (including asbestos, silicates, silica, and radioactive particles), and organic particulate.

"Collection area" means the area surrounding a ground-water source which is underlain by collection pipes, tile, tunnels, infiltration boxes, or other ground-water collection devices.

"Combined distribution system" is the interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

"Commission" means the Operator Certification Commission.

"Community Water System" (CWS) means a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

"Compliance cycle" means the nine-year calendar year cycle during which public water systems must monitor. Each compliance cycle consists of three three-year compliance periods. The first calendar year cycle began January 1, 1993 and ends December 31, 2001; the second begins January 1, 2002 and ends December 31, 2010; the third begins January 1, 2011 and ends December 31, 2019.

"Compliance period" means a three-year calendar year period within a compliance cycle. Each compliance cycle has three three-year compliance periods. Within the first compliance cycle, the first compliance period ran from January 1, 1993 to December 31, 1995; the

second from January 1, 1996 to December 31, 1998; and the third is from January 1, 1999 to December 31, 2001.

"Comprehensive Performance Evaluation" (CPE) is a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements. For purposes of compliance with these rules, the comprehensive performance evaluation must consist of at least the following components: Assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a CPE report.

"Confirmed SOC contamination area" means an area surrounding and including a plume of SOC contamination of the soil or water which previous monitoring results have confirmed. The area boundaries may be determined by measuring 3,000 feet horizontally from the outermost edges of the confirmed plume. The area includes deeper aquifers even though only the shallow aquifer is the one contaminated.

"Confluent growth" means a continuous bacterial growth covering the entire filtration area of a membrane filter, or a portion of the filtration area in which discrete bacterial colonies can not be distinguished.

"Consecutive system" is a public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system or one or more consecutive systems.

"Contaminant" means any physical, chemical biological, or radiological substance or matter in water.

"Continuing Education Unit" (CEU) means ten contact hours of participation in, and successful completion of, an organized and approved continuing education experience under responsible sponsorship, capable direction, and qualified instruction. College credit in approved courses may be substituted for CEUs on an equivalency basis.

"Conventional Surface Water Treatment" means a series of processes including coagulation, flocculation, sedimentation, filtration and disinfection resulting in substantial particulate removal and inactivation of pathogens.

"Controls" means any codes, ordinances, rules, and regulations that a public water system can cite as currently in effect to regulate potential contamination sources; any physical conditions which may prevent contaminants from migrating off of a site and into surface or ground water; and any site with negligible quantities of contaminants.

"Corrective Action" refers to a rating placed on a system by the Division and means a provisional rating for a public water system not in compliance with the Rules of R309, but making all the necessary changes outlined by the Director to bring them into compliance.

"Corrosion inhibitor" means a substance capable of reducing the corrosiveness of water toward metal plumbing materials, especially lead and copper, by forming a protective film on the interior surface of those materials.

"Credit Enhancement Agreement" means any agreement entered into between the Board, on behalf of the State, and an eligible water system for the purpose of providing methods and assistance to eligible water systems to improve the security for and marketability of drinking water project obligations.

"Criteria" means the conceptual standards that form the basis for DWSP area delineation to include distance, ground-water time of travel, aquifer boundaries, and ground-water divides.

"Criteria threshold" means a value or set of values selected to represent the limits above or below which a given criterion will cease to provide the desired degree of protection.

"Cross-Connection" means any actual or potential connection between a drinking (potable) water system and any other source or system through which it is possible to introduce into the public drinking water system any used water, industrial fluid, gas or substance other than the intended potable water. For example, if you have a pump moving non-potable water and hook into the drinking water system to supply water for the pump seal, a cross-connection or mixing may lead to contamination of the drinking water. Also see backsiphonage, backpressure and backflow.

"Cross Connection Control Program" means the program administered by the public water system in which cross connections are either eliminated or controlled.

"Cross Connection Control Commission" means the duly constituted advisory subcommittee appointed by the Board to advise the Board on Backflow Technician Certification and the Cross Connection Control Program of Utah.

"CT" or "CT_{calc}" is the product of "residual disinfectant concentration" (C) in mg/l determined before or at the first customer, and the corresponding "disinfectant contact time" (T) in minutes, i.e., "C" x "T." If a public water system applies disinfectant at more than one point prior to the first customer, the summation of each CT value for each disinfectant sequence before or at the first customer determines the total percent inactivation or "Total Inactivation Ratio." In determining the Total Inactivation Ratio, the public water system must determine the residual disinfectant concentration of each disinfection sequence and corresponding contact time before any subsequent disinfection application point(s).

"$CT_{req'd}$" is the CT value required when the log reduction credit given the filter is subtracted from the (3-log) inactivation requirement for Giardia lamblia or the (4-log) inactivation requirement for viruses.

"$CT_{99.9}$" is the CT value required for 99.9 percent (3-log) inactivation of Giardia lamblia cysts. $CT_{99.9}$ for a variety of disinfectants and conditions appear in Tables 1.1-1.6, 2.1, and 3.1 of Section 141.74(b)(3) in the code of Federal Regulations (also available from the Division).

"Designated person" means the person appointed by a public water system to ensure that the requirements of their Drinking Water Source Protection Plan(s) for ground water sources and/or surface water sources are met.

"Desired Design Discharge Rate" means the discharge rate selected for the permanent pump installed in a public drinking water well source. This pumping rate is selected by the water system owner or engineer and can match or be the same rate utilized during the constant rate pump test required by R309-515 and R309-600 to determine delineated protection zones. For consideration of the number of permanent residential connections or ERC's that a well source can support (see Safe Yield) the Director will consider 2/3 of the test pumping rate as the safe yield.

"Detectable residual" means the minimum level of free chlorine in the water that the analysis method is capable of detecting and indicating positive confirmation.

"Direct Employment" means that the operator is directly compensated by the drinking water system to operate that drinking water system.

"Direct Filtration" means a series of processes including coagulation and filtration, but excluding sedimentation, resulting in substantial particulate removal.

"Direct Responsible Charge" means active on-site control and management of routine maintenance and operation duties. A person in direct responsible charge is generally an operator of a water treatment plant or distribution system who independently makes decisions during normal operation which can affect the sanitary quality, safety, and adequacy of water delivered to customers. In cases where only one operator is employed by the system, this operator shall be considered to be in direct responsible charge.

"Director" means the Director of the Division of Drinking Water.

"Disadvantaged Communities" are defined as those communities located in an area which has a median adjusted gross income which is less than or equal to 80% of the State's median adjusted gross income, as determined by the Utah State Tax commission from federal individual income tax returns excluding zero exemptions returns.

"Discipline" means type of certification (Distribution or Treatment).

"Disinfectant Contact Time" ("T" in CT calculations) means the time in minutes that it takes water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant

concentration ("C") is measured. Where only one "C" is measured, "T" is the time in minutes that it takes water to move from the point of disinfectant application to a point before or at where residual disinfectant concentration ("C") is measured. Where more than one "C" is measured, "T" is (a) for the first measurement of "C," the time in minutes that it takes water to move from the first or only point of disinfectant application to a point before or at the point where the first "C" is measured and (b) for subsequent measurements of "C," the time in minutes that it takes for water to move from the previous "C" measurement point to the "C" measurement point for which the particular "T" is being calculated. Disinfectant contact time in pipelines must be calculated by dividing the internal volume of the pipe by the maximum hourly flow rate through that pipe. Disinfectant contact time within mixing basins and storage reservoirs must be determined by tracer studies or an equivalent demonstration.

"Disinfection" means a process which inactivates pathogenic organisms in water by chemical oxidants or equivalent agents (see also Primary Disinfection and Secondary Disinfection).

"Disinfection profile" is a summary of daily Giardia lamblia inactivation through the treatment plant.

"Distribution System" means the use of any spring or well source, distribution pipelines, appurtenances, and facilities which carry water for potable use to consumers through a public water supply. Systems which chlorinate groundwater are in this discipline.

"Distribution System Manager" means the individual responsible for all operations of a distribution system.

"Division" means the Utah Division of Drinking Water, who acts as staff to the Director and is also part of the Utah Department of Environmental Quality.

"Dose-monitoring Strategy" is the method by which a UV reactor maintains the required dose at or near some specified value by monitoring UV dose delivery. Such strategies must include, at a minimum, flow rate and UV intensity (measured via duty UV sensor) and lamp status. They sometimes include UVT and lamp power. Two common Dose-monitoring Strategies are the UV Intensity Setpoint Approach and the Calculated Dose Approach.

(1) The "UV Intensity Setpoint Approach" relies on one or more "setpoints" for UV intensity that are established during validation testing to determine UV dose. During operations, the UV intensity as measured by the UV sensors must meet or exceed the setpoint(s) to ensure delivery of the required dose. Reactors must also be operated within validated operation conditions for flow rates and lamp status. In the UV Intensity Setpoint Approach, UVT does not need to be monitored separately. Instead, the intensity readings by the sensors account for changes in UVT. The operating strategy can be with either a single setpoint (one UV intensity setpoint is used for all validated flow rates) or a variable setpoint (the UV intensity setpoint is determined using a lookup table or equation for a range of flow rates).

(2) The "Calculated Dose Approach" uses a dose-monitoring equation to estimate the UV dose based on operating conditions (typically flow rate, UV intensity, and UVT). The dose-monitoring equation may be developed by the UV manufacturers using numerical methods; or the systems use an empirical dose-monitoring equation developed through validation testing. During reactor operations, the UV reactor control system inputs the measured parameters into the dose-monitoring equation to produce a calculated dose. The system operator divides the calculated dose by the Validation Factor (see the 2006 Final UV Guidance Manual Chapter 5 for more details on the Validation Factor) and compares the resulting value to the required dose for the target pathogen and log inactivation level.

"Dose Equivalent" means the product of the absorbed dose from ionizing radiation and such factors as account for differences in biological effectiveness due to the type of radiation and its distribution in the body as specified by the International Commission of Radiological Units and Measurements (ICRU).

"Drinking Water" means water that is fit for human consumption and meets the quality standards of R309-200. Common usage of terms such as culinary water, potable water or finished water are synonymous with drinking water.

"Drinking Water Project" means any work or facility necessary or desirable to provide water for human consumption and other domestic uses which has at least fifteen service connections or serves an average of twenty-five individuals daily for at least sixty days of the year and includes collection, treatment, storage, and distribution facilities under the control of the operator and used primarily with the system and collection, pretreatment or storage facilities used primarily in connection with the system but not under such control.

"Drinking Water Project Obligation" means any bond, note or other obligation issued to finance all or part of the cost of acquiring, constructing, expanding, upgrading or improving a drinking water project.

"Drinking Water Regional Planning" means a county wide water plan, administered locally by a coordinator, who facilitates the input of representatives of each public water system in the county with a selected consultant, to determine how each public water system will either collectively or individually comply with source protection, operator certification, monitoring (including consumer confidence reports), capacity development (including technical, financial and managerial aspects), environmental issues, available funding and related studies.

"Dual sample set" is a set of two samples collected at the same time and same location, with one sample analyzed for TTHM and the other sample analyzed for HAA5. Dual sample sets are collected for the purposes of conducting an IDSE under R309-210-9 and determining compliance with the TTHM and HAA5 MCLs under R309-210-10.

"Duty UV Sensors (or Duty Sensors)" are on-line sensors installed in the UV reactor and continuously monitor UV intensity during UV equipment operations.

"DWSP Program" means the program to protect drinking water source protection zones and management areas from contaminants that may have an adverse effect on the health of persons.

"DWSP Zone" means the surface and subsurface area surrounding a ground-water or surface water source of drinking water supplying a PWS, over which or through which contaminants are reasonably likely to move toward and reach such water source.

"Emergency Storage" means that storage tank volume which provides water during emergency situations, such as pipeline failures, major trunk main failures, equipment failures, electrical power outages, water treatment facility failures, source water supply contamination, or natural disasters.

"Engineer" means a person licensed under the Professional Engineers and Land Surveyors Licensing Act, 58-22 of the Utah Code, as a "professional engineer" as defined therein.

"Enhanced coagulation" means the addition of sufficient coagulant for improved removal of disinfection byproduct precursors by conventional filtration treatment.

"Enhanced softening" means the improved removal of disinfection byproduct precursors by precipitative softening.

"Equalization Storage" means that storage tank volume which stores water during periods of low demand and releases the water under periods of high demand. Equalization storage provides a buffer between the sources and distribution for the varying daily water demands. Typically, water demands are high in the early morning or evening and relatively low in the middle of the night. A rule-of-thumb for equalization storage volume is that it should be equal to one average day's use.

"Equivalent Residential Connection" (ERC) is a term used to evaluate service connections to consumers other than the typical residential domicile. Public water system management is expected to review annual metered drinking water volumes delivered to non-residential connections and estimate the equivalent number of residential connections that these represent based upon the average of annual metered drinking water volumes delivered to true single family residential connections. This information is utilized in evaluation of the system's source and storage capacities (refer to R309-510).

"Existing ground-water source of drinking water" means a public supply ground-water source for which plans and specifications were submitted to the Division on or before July 26, 1993.

"Existing surface water source of drinking water" means a public supply surface water source for which plans and specifications were submitted to the Division on or before June 12, 2000.

"Filtration" means a process for removing particulate matter from water by passage through porous media.

"Filter profile" is a graphical representation of individual filter performance, based on continuous turbidity measurements or total particle counts verus time for an entire filter run, from startup to backwash inclusively, that includes an assessment of filter performance while another filter is being backwashed.

"Financial Assistance" means a drinking water project loan, credit enhancement agreement, interest buy-down agreement or hardship grant.

"Finished water" is water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (e.g., booster disinfection, addition of corrosion control chemicals).

"Fire Suppression Storage" means that storage tank volume allocated to fire suppression activities. It is generally determined by the requirements of the local fire marshal, expressed in gallons, and determined by the product of a minimum flowrate in gpm and required time expressed in minutes.

"First draw sample" means a one-liter sample of tap water, collected in accordance with an approved lead and copper sampling site plan, that has been standing in plumbing pipes at least 6 hours and is collected without flushing the tap.

"Flash Mix" is the physical process of blending or dispersing a chemical additive into an unblended stream. Flash Mixing is used where an additive needs to be dispersed rapidly (within a period of one to ten seconds). Common usage of terms such as "rapid mix" or "initial mix" are synonymous with flash mix.

"Floc" means flocculated particles or agglomerated particles formed during the flocculation process. Flocculation enhances the agglomeration of destabilized particles and colloids toward settleable (or filterable) particles (flocs). Flocculated particles may be small (less than 0.1 mm diameter) micro flocs or large, visible flocs (0.1 to 3.0 mm diameter).

"Flocculation" means a process to enhance agglomeration of destabilized particles and colloids toward settleable (or filterable) particles (flocs). Flocculation begins immediately after destabilization in the zone of decaying mixing energy (downstream from the mixer) or as a result of the turbulence of transporting flow. Such incidental flocculation may be an adequate flocculation process in some instances. Normally flocculation involves an intentional and defined process of gentle stirring to enhance contact of destabilized particles

and to build floc particles of optimum size, density, and strength to be subsequently removed by settling or filtration.

"Flowing stream" is a course of running water flowing in a definite channel.

"fps" means feet per second and is one way of expressing the velocity of water.

"G" is used to express the energy required for mixing and for flocculation. It is a term which is used to compare velocity gradients or the relative number of contacts per unit volume per second made by suspended particles during the flocculation process. Velocity gradients G may be calculated from the following equation: G = square root of the value(550 times P divided by u times V). Where: P = applied horsepower, u = viscosity, and V = effective volume.

"GAC10" means granular activated carbon filter beds with an empty-bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days, except that the reactivation frequency for GAC10 used as a best available technology for compliance with R309-210-10 MCLs under R309-200-5(3)(i)(A) shall be 120 days.

"GAC20" means granular activated carbon filter beds with an empty-bed contact time of 20 minutes based on average daily flow and a carbon reactivation frequency of every 240 days.

"Geologist" means a person licensed under the Professional Geologist Licensing Act, 58-76 of the Utah Code, as a "professional geologist" as defined therein.

"Geometric Mean" the geometric mean of a set of N numbers X_1, X_2, X_3,...., X_N is the Nth root of the product of the numbers.

"gpd" means gallons per day and is one way of expressing average daily water demands experienced by public water systems.

"gpm" means gallons per minute and is one way of expressing flowrate.

"gpm/sf" means gallons per minute per square foot and is one way of expressing flowrate through a surface area.

"Grade" means any one of four possible steps within a certification discipline of either water distribution or water treatment. Grade I indicates knowledge and experience requirements for the smallest type of public water supply. Grade IV indicates knowledge and experience levels appropriate for the largest, most complex type of public water supply.

"Gross Alpha Particle Activity" means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

"Gross Beta Particle Activity" means the total radioactivity due to beta particle emission as inferred from measurements on a dry sample.

"ground water of high quality" means a well or spring producing water deemed by the Director to be of sufficiently high quality that no treatment is required. Such sources shall have been designed and constructed in conformance with these rules, have been tested to establish that all applicable drinking water quality standards (as given in rule R309-200) are reliably and consistently met, have been deemed not vulnerable to natural or man-caused contamination, and the public water system management have established adequate protection zones and management policies in accordance with rule R309-600.

"ground water of low quality" means a well or spring which, as determined by the Director, cannot reliably and consistently meet the drinking water quality standards described in R309-200. Such sources shall be deemed to be a low quality ground water source if any of the conditions outlined in subsection R309-505-8(1) exist. Ground water that is classified "UDI" is a subset of this definition and requires "conventional surface water treatment" or an acceptable alternative.

"Ground Water Source" means any well, spring, tunnel, adit, or other underground opening from or through which ground water flows or is pumped from subsurface water-bearing formations.

"Ground Water Under the Direct Influence of Surface Water" or "UDI" or "GWUDI" means any water beneath the surface of the ground with significant occurrence of insects or other macro organisms, algae, or large-diameter pathogens such as Giardia lamblia, or Cryptosporidium, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. Direct influence will be determined for individual sources in accordance with criteria established by the Director. The determination of direct influence may be based on site-specific measurements of water quality and/or documentation of well or spring construction and geology with field evaluation.

"Haloacetic acids"(five) (HAA5) mean the sum of the concentrations in mg/L of the haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid), rounded to two significant figures after addition.

"Hardship Grant" means a grant of monies to a political subdivision that meets the drinking water project loan considerations whose project is determined by the Board to not be economically feasible unless grant assistance is provided. A hardship grant may be authorized in the following forms:

(1) a Planning Advance which will be required to be repaid at a later date, to help meet project costs incident to planning to determine the economic, engineering and financial feasibility of a proposed project;

(2) a Design Advance which will be required to be repaid at a later date, to help meet project costs incident to design including, but not limited to, surveys, preparation of plans, working drawings, specifications, investigations and studies; or

(3) a Project Grant which will not be required to be repaid.

"Hardship Grant Assessment" means an assessment applied to loan recipients. The assessment shall be calculated as a percentage of principal. Hardship grant assessment funds shall be subject to the requirements of UAC R309-700 for hardship grants.

"Hotel, Motel or Resort" shall include tourist courts, motor hotels, resort camps, hostels, lodges, dormitories and similar facilities, and shall mean every building, or structure with all buildings and facilities in connection, kept, used, maintained as, advertised as, or held out to the public to be, a place where living accommodations are furnished to transient guests or to groups normally occupying such facilities on a seasonal or short term basis.

"Hydrogeologic methods" means the techniques used to translate selected criteria and criteria thresholds into mappable delineation boundaries. These methods include, but are not limited to, arbitrary fixed radii, analytical calculations and models, hydrogeologic mapping, and numerical flow models.

"Inactivation" means, in the context of UV disinfection, a process by which a microorganism is rendered unable to reproduce, thereby rendering it unable to infect a host.

"Initial compliance period" means the first full three-year compliance period which begins at least 18 months after promulgation, except for contaminants listed in R309-200-5(3)(a), Table 200-2 numbers 19 to 33; R309-200-5(3)(b), Table 200-3 numbers 19 to 21; and R309-200-5(1)(c), Table 200-1 numbers 1, 5, 8, 11 and 18, initial compliance period means the first full three-year compliance after promulgation for systems with 150 or more service connections (January 1993-December 1995), and first full three-year compliance period after the effective date of the regulation (January 1996-December 1998) for systems having fewer than 150 service connections.

"Intake", for the purposes of surface water drinking water source protection, means the device used to divert surface water and also the conveyance to the point immediately preceding treatment, or, if no treatment is provided, at the entry point to the distribution system.

"Interest Buy-Down Agreement" means any agreement entered into between the Board, on behalf of the State, and a political subdivision, for the purpose of reducing the cost of financing incurred by a political subdivision on bonds issued by the subdivision for drinking water project costs.

"Labor Camp" shall mean one or more buildings, structures, or grounds set aside for use as living quarters for groups of migrant laborers or temporary housing facilities intended to accommodate construction, industrial, mining or demolition workers.

"Lake / reservoir" refers to a natural or man made basin or hollow on the Earth's surface in which water collects or is stored that may or may not have a current or single direction of flow.

"Land management strategies" means zoning and non-zoning controls which include, but are not limited to, the following: zoning and subdivision ordinances, site plan reviews, design and operating standards, source prohibitions, purchase of property and development rights, public education programs, ground water monitoring, household hazardous waste collection programs, water conservation programs, memoranda of understanding, written contracts and agreements, and so forth.

"Land use agreement" means a written agreement, memoranda or contract wherein the owner(s) agrees not to locate or allow the location of uncontrolled potential contamination sources or pollution sources within zone one of new wells in protected aquifers or zone one of surface water sources. The owner(s) must also agree not to locate or allow the location of pollution sources within zone two of new wells in unprotected aquifers and new springs unless the pollution source agrees to install design standards which prevent contaminated discharges to ground water. This restriction must be binding on all heirs, successors, and assigns. Land use agreements must be recorded with the property description in the local county recorder's office. Refer to R309-600-13(2)(d).

Land use agreements for protection areas on publicly owned lands need not be recorded in the local county recorder office. However, a letter must be obtained from the Administrator of the land in question and meet the requirements described above.

"Large water system" for the purposes of R309-210-6 only, means a water system that serves more than 50,000 persons.

"Lead free" means, for the purposes of R309-210-6, when used with respect to solders and flux refers to solders and flux containing not more than 0.2 percent lead; when used with respect to pipes and pipe fittings refers to pipes and pipe fittings containing not more than 8.0 percent lead; and when used with respect to plumbing fittings and fixtures intended by the manufacturer to dispense water for human ingestion refers to fittings and fixtures that are in compliance with standards established in accordance with 42 U.S.C. 300 g-6(e).

"Lead service line" means a service line made of lead which connects the water main to the building inlet and any lead pigtail, gooseneck or other fitting which is connected to such lead line.

"Legionella" means a genus of bacteria, some species of which have caused a type of pneumonia called Legionnaires Disease.

"Locational running annual average (LRAA)" is the average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters.

"Major Bacteriological Routine Monitoring Violation" means that no routine bacteriological sample was taken as required by R309-210-5(1).

"Major Bacteriological Repeat Monitoring Violation" - means that no repeat bacteriological sample was taken as required by R309-210-5(2).

"Major Chemical Monitoring Violation" - means that no initial background chemical sample was taken as required in R309-515-4(5).

"Management area" means the area outside of zone one and within a two-mile radius where the Optional Two-mile Radius Delineation Procedure has been used to identify a protection area.

For wells, land may be excluded from the DWSP management area at locations where it is more than 100 feet lower in elevation than the total drilled depth of the well.

For springs and tunnels, the DWSP management area is all land at elevation equal to or higher than, and within a two-mile radius, of the spring or tunnel collection area. The DWSP management area also includes all land lower in elevation than, and within 100 horizontal feet, of the spring or tunnel collection area. The elevation datum to be used is the point of water collection. Land may also be excluded from the DWSP management area at locations where it is separated from the ground water source by a surface drainage which is lower in elevation than the spring or tunnel collection area.

"Man-Made Beta Particle and Photon Emitters" means all radionuclides emitting beta particles and/or photons listed in Maximum Permissible Body Burdens and maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure, "NBS Handbook 69," except the daughter products of thorium-232, uranium-235 and uranium-238.

"Master Plan" (or "System Capacity and Expansion Report") means a organized plan addressing the present and future demands that will be placed on a public drinking water system by expanding into undeveloped areas or accepting additional service contracts. As a minimum a satisfactory master plan must contain the following elements:

(a) A listing of sources including: the source name, the source type (i.e., well, spring, reservoir, stream etc.) for both existing sources and additional sources identified as needed for system expansion, the minimum reliable flow of the source in gallons per minute, the status of the water right and the flow capacity of the water right.

(b) A listing of storage facilities including: the storage tank name, the type of material (i.e., steel, concrete etc.), the diameter, the total volume in gallons, and the elevation of the overflow, the lowest level (elevation) of the equalization volume, the fire suppression volume, and the emergency volume or the outlet.

(c) A listing of pump stations including: the pump station name and the pumping capacity in gallons per minute. Under this requirement one does not need to list well pump stations as they are provided in requirement (a) above.

(d) A listing of the various pipeline sizes within the distribution system with their associated pipe materials and, if readily available, the approximate length of pipe in each size and material category. A schematic of the distribution piping showing node points, elevations, length and size of lines, pressure zones, demands, and coefficients used for the hydraulic analysis required by (h) below will suffice.

(e) A listing by customer type (i.e., single family residence, 40 unit condominium complex, elementary school, junior high school, high school, hospital, post office, industry, commercial etc.) along with an assessment of their associated number of ERC'S.

(f) The number of connections along with their associated ERC value that the public drinking water system is committed to serve, but has not yet physically connected to the infrastructure.

(g) A description of the nature and extent of the area currently served by the water system and a plan of action to control addition of new service connections or expansion of the public drinking water system to serve new development(s). The plan shall include current number of service connections and water usage as well as land use projections and forecasts of future water usage.

(h) A hydraulic analysis of the existing distribution system along with any proposed distribution system expansion identified in (g) above.

(i) A description of potential alternatives to manage system growth, including interconnections with other existing public drinking water systems, developer responsibilities and requirements, water rights issues, source and storage capacity issues and distribution issues.

"Maximum Contaminant Level" (MCL) means the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

"Maximum residual disinfectant level" (MRDL) means a level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. For chlorine and chloramines, a PWS is in compliance with the MRDL when the running annual average of monthly averages of samples taken in the distribution system, computed quarterly, is less than or equal to the MRDL. For chlorine dioxide, a PWS is in compliance with the MRDL when daily samples are taken at the entrance to the distribution system and no two consecutive daily samples exceed the MRDL. MRDLs are enforceable in the same manner as MCLs pursuant to UT Code S 19-4-104. There is convincing evidence that addition of a disinfectant is necessary for control of waterborne microbial contaminants. Notwithstanding the MRDLs listed in R309-200-5(3),

operators may increase residual disinfectant levels of chlorine or chloramines (but not chlorine dioxide) in the distribution system to a level and for a time necessary to protect public health to address specific microbiological contamination problems caused by circumstances such as distribution line breaks, storm runoff events, source water contamination, or cross-connections.

"Maximum residual disinfectant level goal" (MRDLG) means the maximum level of a disinfectant added for water treatment at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MRDLGs are non-enforceable health goals and do not reflect the benefit of the addition of the chemical for control of waterborne microbial contaminants.

"Medium-size water system" for the purposes of R309-210-6 only, means a water system that serves greater than 3,300 and less than or equal to 50,000 persons.

"Membrane filtration" is a pressure or vacuum driven separation process in which particulate matter larger than 1 micrometer is rejected by an engineered barrier, primarily through a size-exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test. This definition includes that common membrane technologies of microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.

"Metropolitan area sources" means all sources within a metropolitan area. A metropolitan area is further defined to contain at least 3,300 year round residents. A small water system which has sources within a metropolitan system's service area, may have those sources classified as a metropolitan area source.

"MG" means million gallons and is one way of expressing a volume of water.

"MGD" means million gallons per day and is one way of expressing average daily water demands experienced by public water systems or the capacity of a water treatment plant.

"mg/L" means milligrams per liter and is one way of expressing the concentration of a chemical in water. At small concentrations, mg/L is synonymous with "ppm" (parts per million).

"Minor Bacteriological Routine Monitoring Violation" means that not all of the routine bacteriological samples were taken as required by R309-210-5(1).

"Minor Bacteriological Repeat Monitoring Violation" means that not all of the repeat bacteriological samples were taken as required by R309-210-5(2).

"Minor Chemical Monitoring Violation" means that the required chemical sample(s) was not taken in accordance with R309-205 and R309-210.

"Modern Recreation Camp" means a campground accessible by any type of vehicular traffic. The camp is used wholly or in part for recreation, training or instruction, social, religious, or physical education activities or whose primary purpose is to provide an outdoor group living experience. The site is equipped with permanent buildings for the purpose of sleeping, a drinking water supply under pressure, food service facilities, and may be operated on a seasonal or short term basis. These types of camps shall include but are not limited to privately owned campgrounds such as youth camps, church camps, boy or girl scout camps, mixed age groups, family group camps, etc.

"Near the first service connection" means one of the service connections within the first 20 percent of all service connections that are nearest to the treatment facilities.

"Negative Interest" means a loan having loan terms with an interest rate at less than zero percent. The repayment schedule for loans having a negative interest rate will be prepared by the Board.

"New ground water source of drinking water" means a public supply ground water source of drinking water for which plans and specifications are submitted to the Division after July 26, 1993.

"New surface water source of drinking water" means a public supply surface water source of drinking water for which plans and specifications are submitted to the Division after June 12, 2000.

"New Water System" means a system that will become a community water system or non-transient, non-community water system on or after October 1, 1999.

"Non-Community Water System" (NCWS) means a public water system that is not a community water system. There are two types of NCWS's: transient and non-transient.

"Non-distribution system plumbing problem" means a coliform contamination problem in a public water system with more than one service connection that is limited to the specific service connection from which a coliform-positive sample was taken.

"Nonpoint source" means any diffuse source of contaminants or pollutants not otherwise defined as a point source.

"Non-Transient Non-Community Water System" (NTNCWS) means a public water system that regularly serves at least 25 of the same nonresident persons per day for more than six months per year. Examples of such systems are those serving the same individuals (industrial workers, school children, church members) by means of a separate system.

"Not Approved" refers to a rating placed on a system by the Division and means the water system does not fully comply with all the Rules of R309 as measured by R309-400.

"NTU" means Nephelometric Turbidity Units and is an acceptable method for measuring the clarity of water utilizing an electronic nephelometer (see "Standard Methods for Examination of Water and Wastewater").

"Off-specification" means a UV facility is operating outside of the validated operating conditions, for example, at a flow rate higher than the validated range or a UVT below the validated range).

"Operator" means a person who operates, repairs, maintains, and is directly employed by a public drinking water system.

"Operator Certification Commission" means the Commission appointed by the Board as an advisory Commission on public water system operator certification.

"Operating Permit" means written authorization from the Director to actually start utilizing a facility constructed as part of a public water system.

"Optimal corrosion control treatment" for the purposes of R309-210-6 only, means the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while insuring that the treatment does not cause the water system to violate any national primary drinking water regulations.

"Package Plants" refers to water treatment plants manufactured and supplied generally by one company which are reportedly complete and ready to hook to a raw water supply line. Caution, some plants do not completely comply with all requirements of these rules and will generally require additional equipment.

"PCBs" means a group of chemicals that contain polychlorinated biphenyl.

"Peak Day Demand" means the amount of water delivered to consumers by a public water system on the day of highest consumption, generally expressed in gpd or MGD. This peak day will likely occur during a particularly hot spell in the summer. In contrast, some systems associated with the skiing industry may experience their "Peak Day Demand" in the winter.

"Peak Hourly Flow" means the maximum hourly flow rate from a water treatment plant and utilized when the plant is preparing disinfection profiling as called for in R309-215-14(2).

"Peak Instantaneous Demand" means calculated or estimated highest flowrate that can be expected through any water mains of the distribution network of a public water system at any instant in time, generally expressed in gpm or cfs (refer to section R309-510-9).

"Person" means an individual, corporation, company, association, partnership; municipality; or State, Federal, or tribal agency.

"Picocurie" (pCi) means that quantity of radioactive material producing 2.22 nuclear transformations per minute.

"Plan Approval" means written approval, by the Director, of contract plans and specifications for any public drinking water project which have been submitted for review prior to the start of construction (see also R309-500-7).

"Plant intake" refers to the works or structures at the head of a conduit through which water is diverted from a source (e.g., river or lake) into the treatment plant.

"Plug Flow" is a term to describe when water flowing through a tank, basin or reactors moves as a plug of water without ever dispersing or mixing with the rest of the water flowing through the tank.

"Point of Disinfectant Application" is the point where the disinfectant is applied and water downstream of that point is not subject to re-contamination by surface water runoff.

"Point of Diversion"(POD) is the point at which water from a surface source enters a piped conveyance, storage tank, or is otherwise removed from open exposure prior to treatment.

"Point-of-Entry Treatment Device" means a treatment device applied to the drinking water entering a house or building for the purpose of reducing contaminants in the drinking water distributed throughout the house or building.

"Point-of-Use Treatment Device" means a treatment device applied to a single tap used for the purpose of reducing contaminants in drinking water at that one tap.

"Point source" means any discernible, confined, and discrete source of pollutants or contaminants, including but not limited to any site, pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, animal feeding operation with more than ten animal units, landfill, or vessel or other floating craft, from which pollutants are or may be discharged.

"Political Subdivision" means any county, city, town, improvement district, metropolitan water district, water conservancy district, special service district, drainage district, irrigation district, separate legal or administrative entity created under Title 11, Chapter 13, Interlocal Cooperation Act, or any other entity constituting a political subdivision under the laws of Utah.

"Pollution source" means point source discharges of contaminants to ground or surface water or potential discharges of the liquid forms of "extremely hazardous substances" which are stored in containers in excess of "applicable threshold planning quantities" as specified in SARA Title III. Examples of possible pollution sources include, but are not limited to, the following: storage facilities that store the liquid forms of extremely hazardous substances, septic tanks, drain fields, class V underground injection wells, landfills, open dumps, landfilling of sludge and septage, manure piles, salt piles, pit privies, drain lines, and animal feeding operations with more than ten animal units.

The following definitions are part of R309-600 and clarify the meaning of "pollution source:"

(1) "Animal feeding operation" means a lot or facility where the following conditions are met: animals have been or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12 month period, and crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Two or more animal feeding operations under common ownership are considered to be a single feeding operation if they adjoin each other, if they use a common area, or if they use a common system for the disposal of wastes.

(2) "Animal unit" means a unit of measurement for any animal feeding operation calculated by adding the following numbers; the number of slaughter and feeder cattle multiplied by 1.0, plus the number of mature dairy cattle multiplied by 1.4, plus the number of swine weighing over 55 pounds multiplied by 0.4, plus the number of sheep multiplied by 0.1, plus the number of horses multiplied by 2.0.

(3) "Extremely hazardous substances" means those substances which are identified in the Sec. 302(EHS) column of the "TITLE III LIST OF LISTS - Consolidated List of Chemicals Subject to Reporting Under SARA Title III," (EPA 550-B-96-015). A copy of this document may be obtained from: NCEPI, PO Box 42419, Cincinnati, OH 45202. Online ordering is also available at http://www.epa.gov/ncepihom/orderpub.html.

"Potential contamination source" means any facility or site which employs an activity or procedure which may potentially contaminate ground or surface water. A pollution source is also a potential contamination source.

"ppm" means parts per million and is one way of expressing the concentration of a chemical in water. At small concentrations generally used, ppm is synonymous with "mg/l" (milligrams per liter).

"Practical Quantitation Level" (PQL) means the required analysis standard for laboratory certification to perform lead and copper analyses. The PQL for lead is .005 milligrams per liter and the PQL for copper is 0.050 milligrams per liter.

"Presedimentation" is a preliminary treatment process used to remove gravel, sand and other particulate material from the source water through settling before the water enters the primary clarification and filtration processes in a treatment plant.

"Primary Disinfection" means the adding of an acceptable primary disinfectant or ultraviolet light irradiation during the treatment process to provide adequate levels of inactivation of bacteria and pathogens. The effectiveness is measured through "CT" values, and the "Total Inactivation Ratio," and the ultraviolet light dose. Acceptable primary disinfectants are, chlorine, ozone, ultraviolet light, and chlorine dioxide (see also "CT" and "$CT_{99.9}$").

"Principal Forgiveness" means a loan wherein a portion of the loan amount is "forgiven" upon closing the loan. The terms for principal forgiveness will be as directed by R309-705-8, and by the Board.

"Project Costs" include the cost of acquiring and constructing any drinking water project including, without limitation: the cost of acquisition and construction of any facility or any modification, improvement, or extension of such facility; any cost incident to the acquisition of any necessary property, easement or right of way; engineering or architectural fees, legal fees, fiscal agent's and financial advisors' fees; any cost incurred for any preliminary planning to determine the economic and engineering feasibility of a proposed project; costs of economic investigations and studies, surveys, preparation of designs, plans, working drawings, specifications and the inspection and supervision of the construction of any facility; interest accruing on loans made under this program during acquisition and construction of the project; and any other cost incurred by the political subdivision, the Board or the Department of Environmental Quality, in connection with the issuance of obligation of the political subdivision to evidence any loan made to it under the law.

"Protected aquifer" means a producing aquifer in which the following conditions are met:

(1) A naturally protective layer of clay, at least 30 feet in thickness, is present above the aquifer;

(2) the PWS provides data to indicate the lateral continuity of the clay layer to the extent of zone two; and

(3) the public supply well is grouted with a grout seal that extends from the ground surface down to at least 100 feet below the surface, and for a thickness of at least 30 feet through the protective clay layer.

"Public Drinking Water Project" means construction, addition to, or modification of any facility of a public water system which may affect the quality or quantity of the drinking water (see also section R309-500-6).

"Public Water System" (PWS) means a system, either publicly or privately owned, providing water through constructed conveyances for human consumption and other domestic uses, which has at least 15 service connections or serves an average of at least 25 individuals daily at least 60 days out of the year and includes collection, treatment, storage, or distribution facilities under the control of the operator and used primarily in connection with the system, or collection, pretreatment or storage facilities used primarily in connection with the system but not under his control (see 19-4-102 of the Utah Code Annotated). All public water systems are further categorized into three different types, community (CWS), non-transient non-community (NTNCWS), and transient non-community (TNCWS). These categories are important with respect to required monitoring and water quality testing found in R309-205 and R309-210 (see also definition of "water system").

"Raw Water" means water that is destined for some treatment process that will make it acceptable as drinking water. Common usage of terms such as lake or stream water, surface water or irrigation water are synonymous with raw water.

"Recreational Home Developments" are subdivision type developments wherein the dwellings are not intended as permanent domiciles.

"Recreational Vehicle Park" means any site, tract or parcel of land on which facilities have been developed to provide temporary living quarters for individuals utilizing recreational vehicles. Such a park may be developed or owned by a private, public or non-profit organization catering to the general public or restricted to the organizational or institutional member and their guests only.

"Reference UV Sensors (or Reference Sensors)" are off-line calibrated UV sensors that are used to assess the duty UV sensors' performance and to determine UV sensor uncertainty.

"Regional Operator" means a certified operator who is in direct responsible charge of more than one public drinking water system.

"Regionalized Water System" means any combination of water systems which are physically connected or operated or managed as a single unit.

"Rem" means the unit of dose equivalent from ionizing radiation to the total body or any internal organ or organ system. A "millirem" (mrem) is 1/1000 of a rem.

"Renewal Course" means a course of instruction, approved by the Subcommittee, which is a prerequisite to the renewal of a Backflow Technician's Certificate.

"Repeat compliance period" means any subsequent compliance period after the initial compliance period.

"Replacement well" means a public supply well drilled for the sole purpose of replacing an existing public supply well which is impaired or made useless by structural difficulties and in which the following conditions are met:

(1) the proposed well location shall be within a radius of 150 feet from an existing ground water supply well; and

(2) the PWS provides a copy of the replacement application approved by the State Engineer (refer to Section 73-3-28 of the Utah Code).

"Required Dose" is the UV dose required for a certain level of log inactivation. Required doses are set forth by the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) and R309-215-15(19)(d)(i) Table 215-5 the UV Dose Table.

"Required reserve" means funds set aside to meet requirements set forth in a loan covenant/bond indenture.

"Residual Disinfectant Concentration" ("C" in CT calculations) means the concentration of disinfectant, measured in mg/L, in a representative sample of water.

"Restricted Certificate" means that the operator has qualified by passing an examination but is in a restricted certification status due to lack of experience as an operator.

"Roadway Rest Stop" shall mean any building, or buildings, or grounds, parking areas, including the necessary toilet, hand washing, water supply and wastewater facilities intended for the accommodation of people using such facilities while traveling on public roadways. It does not include scenic view or roadside picnic areas or other parking areas if these are properly identified

"Routine Chemical Monitoring Violation" means no routine chemical sample(s) was taken as required in R309-205, R309-210 and R309-215.

"Safe Yield" means the annual quantity of water that can be taken from a source of supply over a period of years without depleting the source beyond its ability to be replenished naturally in "wet years".

"Sanitary Seal" means a cap that prevents contaminants from entering a well through the top of the casing.

"scfm/sf" means standard cubic foot per minute per square foot and is one way of expressing flowrate of air at standard density through a filter or duct area.

"Secondary Disinfection" means the adding of an acceptable secondary disinfectant to assure that the quality of the water is maintained throughout the distribution system. The effectiveness is measured by maintaining detectable disinfectant residuals throughout the distribution system. Acceptable secondary disinfectants are chlorine, chloramine, and chlorine dioxide.

"Secondary Maximum Contaminant Level" means the advisable maximum level of contaminant in water which is delivered to any user of a public water system.

"Secretary to the Subcommittee" means that individual appointed by the Director to conduct the business of the Subcommittee.

"Sedimentation" means a process for removal of solids before filtration by gravity or separation.

"Semi-Developed Camp" means a campground accessible by any type of vehicular traffic. Facilities are provided for both protection of site and comfort of users. Roads, trails and campsites are defined and basic facilities (water, flush toilets and/or vault toilets, tables,

fireplaces or tent pads) are provided. These camps include but are not limited to National Forest campgrounds, Bureau of Reclamation campgrounds, and youth camps.

"Service Connection" means the constructed conveyance by which a dwelling, commercial or industrial establishment, or other water user obtains water from the supplier's distribution system. Multiple dwelling units such as condominiums or apartments, shall be considered to have a single service connection, if fed by a single line, for the purpose of microbiological repeat sampling; but shall be evaluated by the supplier as multiple "equivalent residential connections" for the purpose of source and storage capacities.

"Service Factor" means a rating on a motor to indicate an increased horsepower capacity beyond nominal nameplate capacity for occasional overload conditions.

"Service line sample" means a one-liter sample of water collected in accordance with R309-210-6(3)(b)(iii), that has been standing for at least 6 hours in a service line.

"Significant deficiencies" means defects in design, operation, or maintenance, or a failure or defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the Director determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

"Single family structure" for the purposes of R309-210-6 only, means a building constructed as a single-family residence that is currently used as either a residence or a place of business.

"Small water system" means a public water system that serves 3,300 persons or fewer.

"Specialist" means a person who has successfully passed the written certification exam and meets the required experience, but who is not in direct employment with a Utah public drinking water system.

"Stabilized drawdown" means that there is less than 0.5 foot of change in water level measurements in a pumped well for a minimum period of six hours.

"Standard sample" means the aliquot of finished drinking water that is examined for the presence of coliform bacteria.

"SOCs" means synthetic organic chemicals.

"Stabilized Drawdown" means the drawdown measurements taken during a constant-rate yield and drawdown test as outlined in subsection R309-515-14(10)(b) are constant (no change).

"Stock Tight" means a type of fence that can prevent the passage of grazing livestock through its boundary. An example of such fencing is provided by design drawing 02838-3

titled "Cattle Exclosure" designed by the U.S. Department of the Interior, Bureau of Land Management, Division of Technical Services (copies available from the Division).

"Subcommittee" means the Cross Connection Control Subcommittee.

"Supplier of water" means any person who owns or operates a public water system.

"Surface Water" means all water which is open to the atmosphere and subject to surface runoff (see also section R309-515-5(1)). This includes conveyances such as ditches, canals and aqueducts, as well as natural features.

"Surface Water Systems" means public water systems using surface water or ground water under the direct influence of surface water as a source that are subject to filtration and disinfection (Federal SWTR subpart H) and the requirements of R309-215 "Monitoring and Water Quality: Treatment Plant Monitoring Requirements."

"Surface Water Systems (Large)" means public water systems using surface water or ground water under the direct influence of surface water as a source that are subject to filtration and disinfection and serve a population of 10,000 or greater (Federal SWTR subpart P and L) and the requirements of R309-215 "Monitoring and Water Quality: Treatment Plant Monitoring Requirements."

"Surface Water Systems (Small)" means public water systems using surface water or ground water under the direct influence of surface water as a source that are subject to filtration and disinfection and serve a population less than 10,000 (Federal SWTR subpart L, T and P (sanitary survey requirements)) and the requirements of R309-215 "Monitoring and Water Quality: Treatment Plant Monitoring Requirements."

"Susceptibility" means the potential for a PWS (as determined at the point immediately preceding treatment, or if no treatment is provided, at the entry point to the distribution system) to draw water contaminated above a demonstrated background water quality concentration through any overland or subsurface pathway. Such pathways may include cracks or fissures in or open areas of the surface water intake, and/or the wellhead, and/or the pipe/conveyance between the intake and the water distribution system or treatment.

"SUVA" means Specific Ultraviolet Absorption at 254 nanometers (nm), an indicator of the humic content of water. It is a calculated parameter obtained by dividing a sample's ultraviolet absorption at a wavelength of 254 nm (UV_{254}) (in m^{-1}) by its concentration of dissolved organic carbon (DOC) (in mg/L).

"System with a single service connection" means a system which supplies drinking water to consumers via a single service line.

"T" is short for "Contact Time" and is generally used in conjunction with either the residual disinfectant concentration (C) in determining CT or the velocity gradient (G) in determining mixing energy GT.

"Target Log Inactivation" means the specific log inactivation the PWS wants to achieve for the target pathogen using UV disinfection. The target log inactivation is driven by requirements of the Surface Water Treatment Rule (SWTR), Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR), Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), and the log removal/inactivation requirements in R309-215-15, and the Groundwater Rule.

"Ten State Standards" refers to the Recommended Standards For Water Works, 1997 by the Great Lakes Upper Mississippi River Board of State Public Health and Environmental Managers available from Health Education Services, A Division of Health Research Inc., P.O. Box 7126, Albany, New York 12224, (518)439-7286.

"Time of travel" means the time required for a particle of water to move in the producing aquifer from a specific point to a ground water source of drinking water. It also means the time required for a particle of water to travel from a specific point along a surface water body to an intake.

"Total Inactivation Ratio" is the sum of all the inactivation ratios calculated for a series of disinfection sequences, and is indicated or shown as: "Summation sign (CT_{calc})/($CT_{req'd}$)." A total inactivation ratio equal to or greater than 1.0 is assumed to provide the required inactivation of Giardia lamblia cysts. $CT_{calc}/CT_{99.9}$ equal to 1.0 provides 99.9 percent (3-log) inactivation, whereas CT_{calc}/CT_{90} equal to 1.0 only provides 90 percent (1-log) inactivation.

"Too numerous to count" (TNTC) means that the total number of bacterial colonies exceeds 200 on a 47 mm diameter membrane filter used for coliform detection.

"Total Organic Carbon" (TOC) means total organic carbon in mg/L measured using heat, oxygen, ultraviolet irradiation, chemical oxidants, or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to two significant figures.

"Total Trihalomethanes" (TTHM) means the MCL for trihalomethanes. This is the sum of four of ten possible isomers of chlorine/bromine/methane compounds, all known as trihalomethanes (THM). TTHM is defined as the arithmetic sum of the concentrations in micro grams per liter of only four of these (chloroform, bromodichloromethane, dibromochloromethane, and bromoform) rounded to two significant figures. This measurement is made by samples which are "quenched," meaning that a chlorine neutralizing agent has been added, preventing further THM formation in the samples.

"Training Coordinating Committee" means the voluntary association of individuals responsible for environmental training in the state of Utah.

"Transient Non-Community Water System" (TNCWS) means a non-community public water system that does not serve 25 of the same nonresident persons per day for more than six months per year. Examples of such systems are those, RV park, diner or convenience

store where the permanent nonresident staff number less than 25, but the number of people served exceeds 25.

"Treatment Plant" means those facilities capable of providing any treatment to any waterserving a public drinking water system. (Examples would include but not be limited to disinfection, conventional surface water treatment, alternative surface water treatment methods, corrosion control methods, aeration, softening, etc.).

"Treatment Plant Manager" means the individual responsible for all operations of a treatment plant.

"Trihalomethanes" (THM) means any one or all members of this class of organic compounds.

"Trihalomethane Formation Potential" (THMFP) - these samples are collected just following disinfection and measure the highest possible TTHM value to be expected in the water distribution system. The formation potential is measured by not neutralizing the disinfecting agent at the time of collection, but storing the sample seven days at 25 degrees C prior to analysis. A chlorine residual must be present in these samples at the end of the seven day period prior to analysis for the samples to be considered valid for this test. Samples without a residual at the end of this period must be resampled if this test is desired.

"Turbidity Unit" refers to NTU or Nephelometric Turbidity Unit.

"Two-stage lime softening" is a process in which chemical addition and hardness precipitation occur in each of two distinct unit clarification processes in series prior to filtration.

"UDI" means under direct influence (see also "Ground Water Under the Direct Influence of Surface Water").

"Uncovered finished water storage facility" is a tank, reservoir, or other facility used to store water that will undergo no further treatment to reduce microbial pathogens except residual disinfection and is directly open to the atmosphere.

"Unprotected aquifer" means any aquifer that does not meet the definition of a protected aquifer.

"Unregulated Contaminant" means a known or suspected disease causing contaminant for which no maximum contaminant level has been established.

"Unrestricted Certificate" means that a certificate of competency issued by the Director when the operator has passed the appropriate level written examination and has met all certification requirements at the discipline and grade stated on the certificate.

"UV Dose" means the UV energy per unit area incident on a surface, typically reported in units of mJ/cm^2 or J/m^2. The UV dose received by a waterborne microorganism in a reactor vessel accounts for the effects on UV intensity of the absorbance of the water, absorbance of the quartz sleeves, reflection and refraction of light from the water surface and reactor walls, and the germicidal effectiveness of the UV wavelengths transmitted. The following terms are related to UV dose:

(1) "Reduction Equivalent Dose (RED)" means the UV dose derived by entering the log inactivation measured during full-scale reactor testing into the UV dose-response curve that was derived through collimated beam testing. RED values are always specific to the challenge microorganism used during experimental testing and the validation test conditions for full-scale reactor testing.

(2) "Required Dose" means the UV dose in units of mJ/cm^2 needed to achieve the target log inactivation for the target pathogen. The required dose is specified in the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR).

(3) "Validated Dose" means the UV dose in units of mJ/cm^2 delivered by the UV reactor as determined through validation testing. The validated dose is compared to the Required Dose to determine log inactivation credit.

(4) "Calculated Dose" - the RED calculated using the dose-monitoring equation that was developed through validation testing.

"UV Facility" means all of the components of the UV disinfection process, including (but not limited to) UV reactors, control systems, piping, valves, and building (if applicable).

"UV Intensity" means the UV power passing through a unit area perpendicular to the direction of propagation. UV intensity is used to describe the magnitude of UV light measured by UV sensors in a reactor or with a radiometer in bench-scale UV experiments.

"UV Reactor" means the vessel or chamber where exposure to UV light takes place, consisting of UV lamps, quartz sleeves, UV sensors, quartz sleeve cleaning systems, and baffles or other hydraulic controls. The UV reactor also includes additional hardware for monitoring UV dose delivery; typically comprised of (but not limited to): UV sensors and UVT monitors.

"UV Reactor Validation" is experimental testing to determine the operating conditions under which a UV reactor delivers the dose required for inactivation credit of Cryptosporidium, Giardia lamblia, and viruses.

"UV Transmittance (UVT)" is a measure of the fraction of incident light transmitted through a material (e.g., water sample or quartz). The UVT is usually reported for a wavelength of 254 nm and a pathlength of 1-cm. If an alternate pathlength is used, it should be specified or converted to units of cm^{-1}.

"Validation Factor" - an uncertainty term that accounts for the bias and uncertainty associated with UV validation testing.

"Validated Operating Conditions" - the operating conditions under which the UV reactor is confirmed as delivering the dose required for LT2ESWTR inactivation credit. These operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status. The term "Validated Operating Conditions" is also commonly referred to as the "validated range" or the "validated limits."

"Virus" means a virus of fecal origin which is infectious to humans.

"Waterborne Disease Outbreak" means the significant occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system, as determined by the appropriate local or State agency.

"Watershed" means the topographic boundary that is the perimeter of the catchment basin that contributes water through a surface source to the intake structure. For the purposes of surface water DWSP, if the topographic boundary intersects the state boundary, the state boundary becomes the boundary of the watershed.

"Water Supplier" means a person who owns or operates a public drinking water system.

"Water System" means all lands, property, rights, rights-of-way, easements and related facilities owned by a single entity, which are deemed necessary or convenient to deliver drinking water from source to the service connection of a consumer(s). This includes all water rights acquired in connection with the system, all means of conserving, controlling and distributing drinking water, including, but not limited to, diversion or collection works, springs, wells, treatment plants, pumps, lift stations, service meters, mains, hydrants, reservoirs, tanks and associated appurtenances within the property or easement boundaries under the control of or controlled by the entity owning the system.

In accordance with R309, certain water systems may be exempted from monitoring requirements, but such exemption does not extend to submittal of plans and specifications for any modifications considered a public drinking water project.

"Wellhead" means the physical structure, facility, or device at the land surface from or through which ground water flows or is pumped from subsurface, water-bearing formations.

"Wholesale system" is a public water system that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another public water system. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

"Zone of Influence" corresponds to area of the upper portion of the cone of depression as described in "Groundwater and Wells," second edition, by Fletcher G. Driscoll, Ph.D., and published by Johnson Division, St. Paul, Minnesota.

KEY: drinking water, definitions
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R309-115. Administrative Procedures.

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R309-115. Administrative Procedures.

R309-115-1. Administrative Procedures.

Administrative proceedings under Utah Safe Drinking Water Act are governed by Rule R305-7.

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R309-200. Monitoring and Water Quality: Drinking Water Standards.

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R309-200. Monitoring and Water Quality: Drinking Water Standards.

R309-200-1. Purpose.

The purpose of this rule is to set forth the water quality and drinking water standards for public water systems.

R309-200-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104 of the Utah Code and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-200-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-200-4. General.

(1) Maximum contaminant levels (MCLs) and treatment techniques are herein established for those routinely measurable substances which may be found in water supplies. "Primary" standards and treatment techniques are established for the protection of human health. "Secondary" regulations are established to provide guidance in evaluating the aesthetic qualities of drinking water.

(2) The applicable "Primary" standards and treatment techniques shall be met by all public drinking water systems. The "Secondary" standards are recommended levels which should be met in order to avoid consumer complaint.

(3) The methods used to determine compliance with these maximum contaminant levels and treatment techniques are given in R309-205 through R309-215. Analytical techniques which shall be followed in making the required determinations shall be as given in 40 CFR 141 as published on July 1, 2008 by the Office of the Federal Register.

(4) Unless otherwise required by the Director, the effective dates on which new analytical methods shall be initiated are identical to the dates published in 40 CFR 141 on July 1, 2008 by the Office of the Federal Register.

(5) If the water fails to meet these minimum standards, then certain public notification procedures shall be carried out, as outlined in R309-220. Water suppliers shall also keep analytical records in their possession, for a required length of time, as outlined in R309-105-17.

R309-200-5. Primary Drinking Water Standards.

(1) Inorganic Contaminants.

(a) The maximum contaminant levels (MCLs) for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, sodium, thallium and total dissolved solids are applicable to community and non-transient non-community water systems.

(b) The MCLs for nitrate, nitrite, and total nitrate, nitrite and sulfate are applicable to community, non-transient non-community, and transient non-community water systems.

(c) The maximum contaminant levels for inorganic chemicals are listed in Table 200-1.

TABLE 200-1
PRIMARY INORGANIC CONTAMINANTS

	CONTAMINANT	MAXIMUM CONTAMINANT LEVEL
1.	Antimony	0.006 mg / L
2.	Arsenic	0.010 mg/L (see Note 5 below)
3.	Asbestos	7 Million Fibers / liter(longer than 10 um)
4.	Barium	2 mg / L
5.	Beryllium	0.004 mg / L
6.	Cadmium	0.005 mg / L
7.	Chromium	0.1 mg / L
8.	Cyanide (as free Cyanide)	0.2 mg / L
9.	Fluoride	4.0 mg / L
10.	Mercury	0.002 mg / L
11.	Nickel	--- (see note 1 below)
12.	Nitrate	10 mg / L (as Nitrogen)(see note 4 below)
13.	Nitrite	1mg / L (as Nitrogen)
14.	Total Nitrate and Nitrite	10 mg / L (as Nitrogen)
15.	Selenium	0.05 mg / L
16.	Sodium	--- (see note 1 below)
17.	Sulfate	1000 mg / L (see note 2 below)
18.	Thallium	0.002 mg / L
19.	Total Dissolved Solids	2000 mg / L (see note 3 below)

NOTE:

(1) No maximum contaminant level has been established for nickel and sodium. However, these contaminant shall be monitored and reported in accordance with the requirements of R309-205-5(3).

(2) If the sulfate level of a public (community, NTNC and non-community) water system is greater than 500 mg/L, the supplier shall satisfactorily demonstrate that:

(a) No better quality water is available, and

(b) The water shall not be available for human consumption from commercial establishments.

In no case shall the Director allow the use of water having a sulfate level greater than 1000 mg/L.

(3) If TDS is greater than 1000 mg/L, the supplier shall satisfactorily demonstrate to the Director that no better water is available. The Director shall not allow the use of an inferior source of water if a better source of water (i.e. lower in TDS) is available.

(4) In the case of a non-community water systems which exceed the MCL for nitrate, the Director may allow, on a case-by-case basis, a nitrate level not to exceed 20 mg/L if the supplier can adequately demonstrate that:

(a) such water will not be available to children under 6 months of age as may be the case in hospitals, schools and day care centers; and

(b) there will be continuous posting of the fact that nitrate levels exceed 10 mg/L and the potential health effect of exposure in accordance with R309-220-12; and

(c) the water is analyzed in conformance to R309-205-5(4); and

(d) that no adverse health effects will result.

(5) The maximum contaminant level for arsenic is 0.05 mg/L until January 23, 2006. The MCL of 0.010 mg/L is effective for the purposes of compliance on January 23, 2006.

(2) Lead and copper.

(a) The lead action level is exceeded if the concentration of lead in more than 10 percent of tap water samples collected during any monitoring period conducted in

accordance with R309-210-6(3) is greater than 0.015 mg/L (i.e., if the "90th percentile" lead level is greater than 0.015 mg/L).

(b) The copper action level is exceeded if the concentration of copper in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with R309-210-6(3) is greater than 1.3 mg/L (i.e., if the "90th percentile" copper level is greater than 1.3 mg/L).

(c) The 90th percentile lead and copper levels shall be computed as follows:

(i) The results of all lead or copper samples taken during a monitoring period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.

(ii) The number of samples taken during the monitoring period shall be multiplied by 0.9.

(iii) The contaminant concentration in the numbered sample yielded by the calculation in paragraph (c)(ii) above is the 90th percentile contaminant level.

(iv) For water systems serving fewer than 100 people that collect 5 samples per monitoring period, the 90th percentile is computed by taking the average of the highest and second highest concentrations.

(v) For a public water system that has been allowed by the Director to collect fewer than five samples in accordance with R309-210-6(3)(c), the sample result with the highest concentration is considered the 90th percentile value.

(3) Organic Contaminants.

The following are the maximum contaminant levels for organic chemicals. For the purposes of R309-100 through R309-R309-605, organic chemicals are divided into three categories: Pesticides/PCBs/SOCs, volatile organic contaminants (VOCs) and total trihalomethanes.

(a) Pesticides/PCBs/SOCs - The MCLs for organic contaminants listed in Table 200-2 are applicable to community water systems and non-transient, non-community water systems.

TABLE 200-2 PESTICIDE/PCB/SOC CONTAMINANTS

	CONTAMINANT	MAXIMUM CONTAMINANT LEVEL
1.	Alachlor	0.002 mg / L
2.	Aldicarb	(see note 1 below)
3.	Aldicarb sulfoxide	(see note 1 below)
4.	Aldicarb sulfone	(see note 1 below)
5.	Atrazine	0.003 mg / L
6.	Carbofuran	0.04 mg / L
7.	Chlordane	0.002 mg / L
8.	Dibromochloropropane	0.0002 mg / L
9.	2, 4-D	0.07 mg / L
10.	Ethylene dibromide	0.00005 mg / L
11.	Heptachlor	0.0004 mg / L
12.	Heptachlor epoxide	0.0002 mg / L
13.	Lindane	0.0002 mg / L
14.	Methoxychlor	0.04 mg / L
15.	Polychlorinated biphenyls	0.0005 mg / L
16.	Pentachlorophenol	0.001 mg / L
17.	Toxaphene	0.003 mg / L
18.	2,4,5-TP	0.05 mg / L
19.	Benzo (a) pyrene	0.0002 mg / L
20.	Dalapon	0.2 mg / L
21.	Di (2-ethylhexyl) adipate	0.4 mg / L
22.	Di (2-ethylhexyl) phthalate	0.006 mg / L
23.	Dinoseb	0.007 mg / L
24.	Diquat	0.02 mg / L
25.	Endothall	0.1 mg / L
26.	Endrin	0.002 mg / L
27.	Glyphosate	0.7 mg / L
28.	Hexachlorobenzene	0.001 mg / L
29.	Hexachlorocyclopentadiene	0.05 mg / L
30.	Oxamyl (Vydate)	0.2 mg / L
31.	Picloram	0.5 mg / L
32.	Simazine	0.004 mg / L
33.	2,3,7,8-TCDD (Dioxin)	0.00000003 mg / L

Note 1: The MCL for this contaminant is under further review, however, this contaminant shall be monitored in accordance with R309-205-6(1).

(b) Volatile organic contaminants - The maximum contaminant levels for organic contaminants listed in Table 200-3 apply to community and non-transient non-community water systems.

TABLE 200-3 VOLATILE ORGANIC CONTAMINANTS		
	CONTAMINANT	MAXIMUM CONTAMINANT LEVEL

1.	Vinyl chloride	0.002 mg / L
2.	Benzene	0.005 mg / L
3.	Carbon tetrachloride	0.005 mg / L
4.	1,2-Dichloroethane	0.005 mg / L
5.	Trichloroethylene	0.005 mg / L
6.	para-Dichlorobenzene	0.075 mg / L
7.	1,1-Dichloroethylene	0.007 mg / L
8.	1,1,1-Trichloroethane	0.2 mg / L
9.	Cis-1,2-Dichloroethylene	0.07 mg / L
10.	1,2-Dichloropropane	0.005 mg / L
11.	Ethylbenzene	0.7 mg / L
12.	Monochlorobenzene	0.1 mg / L
13.	o-Dichlorobenzene	0.6 mg / L
14.	Styrene	0.1 mg / L
15.	Tetrachloroethylene	0.005 mg / L
16.	Toluene	1 mg / L
17.	Trans-1,2-Dichloroethylene	0.1 mg / L
18.	Xylenes (total)	10 mg / L
19.	Dichloromethane	0.005 mg / L
20.	1,2,4-Trichlorobenzene	0.07 mg / L
21.	1,1,2-Trichloroethane	0.005 mg / L

(c) Disinfection Byproducts and Disinfectant Residuals:

(i) Community and Non-transient non-community water systems. Surface Water systems serving 10,000 or more persons shall comply with this section beginning January 1, 2002. Surface water systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water shall comply with this section beginning January 1, 2004.

(A) Compliance with the disinfection byproduct MCLs listed in Table 200-4 shall be determined by the procedures listed in R309-210-8(6) until the date specified by system size listed in R309-210-10(1)(c) at which time compliance shall be determined utilizing LRAA as specified in R309-210-10(1)(d).

(ii) Transient non-community water systems. Surface water systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant shall comply with the chlorine dioxide MRDL beginning January 1, 2002. Surface water systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant shall comply with the chlorine dioxide MRDL beginning January 1, 2004.

(iii) The maximum contaminant levels (MCLs) for disinfection byproducts are listed in Table 200-4.

TABLE 200-4 DISINFECTION BYPRODUCTS	
Total Trihalomethanes (TTHM)	0.080 mg/l
Haloacetic acids (five) (HAA5)	0.060 mg/l
Bromate	0.010 mg/l
Chlorite	1.0 mg/l

(iv) The maximum residual disinfectant levels (MRDLs) are listed in Table 200-5.

TABLE 200-5 MAXIMUM RESIDUAL DISINFECTANT LEVELS	
Chlorine	4.0 mg/l (as Cl_2)
Chloramines	4.0 mg/l (as Cl_2)
Chlorine dioxide	0.8 mg/l (as ClO_2)

(v) Control of Disinfectant Residuals. Notwithstanding the MRDLs listed in Table 200-5, systems may increase residual disinfectant levels in the distribution system of chlorine or chloramines (but not chlorine dioxide) to a level and for a time necessary to protect public health, to address specific microbiological contamination problems caused by circumstances such as, but not limited to, distribution line breaks, storm run-off events, source water contamination events, or cross-connection events.

(vi) A system that is installing GAC or membrane technology to comply with this section may apply to the Director for an extension of up to 24 months past the dates in paragraph (c)(i) of this section, but not beyond December 31, 2003. In granting the extension, the Director shall set a schedule for compliance and may specify any interim measures that the system shall take. Failure to meet the schedule or interim treatment requirements constitutes a violation of Utah Public Drinking Water Rules.

(4) Radiologic Chemicals.

(a) Compliance dates. Compliance dates for combined radium-226 and -228, gross alpha particle activity, gross beta particle and photon radioactivity, and uranium: Community water systems shall comply with the MCLs listed in paragraphs (b), (c), (d), and (e) of this section beginning December 8, 2003 and compliance shall be determined in accordance with the requirements of this sub-section (4) and R309-205-7. Compliance with reporting requirements for the radionuclides under R309-220 and R309-225 is required on December 8, 2003.

(b) Combined radium-226 and -228. The maximum contaminant level for combined radium-226 and radium-228 is 5 pCi/L. The combined radium-226 and radium-228 value is determined by the addition of the results of the analysis for radium-226 and the analysis for radium-228.

(c) Gross alpha particle activity (excluding radon and uranium). The maximum contaminant level for gross alpha particle activity (including radium-226 but excluding radon and uranium) is 15 pCi/L.

(d) The MCL for beta particle and photon radioactivity.

(i) The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year (mrem/year).

(ii) Except for the radionuclides listed in Table 200-6, the concentration of man-made radionuclides causing 4 mrem total body or organ dose equivalents shall be calculated on the basis of 2 liters per day drinking water intake using the 168 hour data list in "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure," NBS (National Bureau of Standards) Handbook 69 as amended August 1963, U.S. Department of Commerce. Copies of this document are available from the National Technical Information Service, NTIS ADA 280 282, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-553-6847. Copies may be inspected at the Division of Drinking Water offices. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed 4 mrem/year.

TABLE 200-6
MAN-MADE RADIONUCLIDE CONTAMINANTS

Average Annual Concentrations Assumed to Produce: A Total Body or Organ Dose of 4 mrem/yr		
RADIONUCLIDE	CRITICAL ORGAN	pCi per liter
Tritium	Total Body	20,000
Strontium-90	Bone Marrow	8

(e) The MCL for uranium. The maximum contaminant level for uranium is 30 ug/L.

(5) TURBIDITY

(a) All public water systems using surface water or ground water under the direct

influence of surface water shall provide treatment consisting of both disinfection, as specified in R309-200-5(7)(a), and filtration treatment which complies with the requirements of paragraph (i), (ii) or (iii) of this section.

(i) Conventional filtration treatment or direct filtration.

(A) For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's combined filtered effluent water shall be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month, measured as specified in R309-200-4(3) and R309-215-9.

(B) The turbidity level of representative samples of a system's combined filtered effluent water shall at no time exceed 1 NTU, measured as specified in R309-200-4(3) and R309-215-9.

(C) A system that uses lime softening may acidify representative samples prior to analysis using a protocol approved by the Director.

(ii) Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in paragraph (i) or (iii) of this section if it demonstrates to the Director, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of R309-200-7, consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts, and the Director approves the use of the filtration technology. For each approval, the Director will set turbidity performance requirements that the system shall meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts. The turbidity level of representative samples shall at no time exceed 5.0 NTU for any treatment technique, measured as specified in R309-215-9(1)(c) and (d)

(iii) The turbidity limit for slow sand filtration and diatomaceous earth filtration shall be less than or equal to 1.0 NTU in at least 95 percent of the measurements taken each month, measured as specified in R309-215-9(1)(c) and (d). For slow sand filtration only, if the Director determines that the system is capable of achieving 99.9 percent removal and inactivation of Giardia lamblia cysts at some turbidity level higher than 1.0 NTU in at least 95 percent of the measurements, the Director may substitute this higher turbidity limit for that system. The turbidity level of representative samples shall at no time exceed 5.0 NTU for any treatment technique, measured as

specified in R309-215-9(1)(c) and (d).

(c) Ground water sources not under the direct influence of surface water:

(i) The following turbidity limit applies to community water systems only.

(ii) The limit for turbidity in drinking water from ground water sources not under the direct influence of surface sources is 5.0 NTU based on an average for two consecutive days pursuant to R309-205-8(3).

(6) MICROBIOLOGICAL QUALITY

(a) The maximum contaminant level (MCL) for microbiological contaminants for all public water systems is:

(i) For a system which collects less than 40 total coliform samples per month, no more than one sample per month may be total coliform-positive.

(ii) For a system which collects 40 or more total coliform samples per month, no more than 5.0 percent of the samples collected during a month may be total coliform-positive.

(b) Any fecal coliform-positive or Escherichia coliform (E. coli)-positive repeat sample or any total coliform-positive repeat sample following a fecal coliform positive or E. coli-positive routine sample constitutes a violation of the MCL for total coliforms. For the purposes of public notification requirements in R309-220-5 this is a violation that may pose an acute risk to health.

(c) For NTNC and transient non-community systems that are required to sample at a rate of less than one per month, compliance with paragraphs (a) or (b) of this subsection shall be determined for the month in which the sample was taken.

(7) DISINFECTION

Continuous disinfection is recommended for all water sources. It shall be required of all ground water sources which do not consistently meet standards of bacteriologic quality. Surface water sources or ground water sources under direct influence of surface water shall be disinfected and continuously monitored for disinfection residual during the course of required conventional complete treatment for systems serving greater than 3,300 people. Disinfection shall not be considered a substitute for inadequate collection or filtration facilities.

Successful disinfection assures 99.9 percent inactivation of Giardia lamblia cysts and 99.99 percent inactivation of enteric viruses. Both filtration and disinfection are considered

treatment techniques to protect against the potential adverse health effects of exposure to Giardia lamblia, viruses, Legionella, and heterotrophic bacteria in water. Minimum disinfection levels are set by "CT" values as defined in R309-110.

(a) Each public water system that provides filtration treatment shall provide disinfection treatment as follows:

(i) The disinfection treatment shall be sufficient to ensure that the total treatment processes of the system achieve at least 99.9 percent (3-log) inactivation and/or removal of Giardia lamblia cysts and at least 99.99 percent (4-log) inactivation and/or removal of viruses, as determined by the Director.

(ii) The residual disinfectant concentration in the water entering the distribution system cannot be less than 0.2 mg/L for more than 4 hours.

(iii) The residual disinfectant concentration in the distribution system, measured as combined chlorine or chlorine dioxide, cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5 percent in one month, for any two consecutive months.

$$V = ((c + d + e) / (a + b)) \times 100$$ where:

a = number of instances where the residual disinfectant concentration is measured;

b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d = number of instances where no residual disinfectant concentration is detected and where HPC is greater than 500/ml;

e = number of instances where the residual disinfectant concentration is not measured and HPC is greater than 500/ml.

(b) If the Director determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified in

Heterotrophic Plate Count (Pour Plate Method) as set forth in the latest edition of Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al. (Method 907A in the 16th edition) and that the system is providing adequate disinfection in the distribution system, the requirements of R309-200-5(7)(a)(iii) do not apply.

(c) If a system utilizes a combination of sources, some surface water influenced (requiring filtration and disinfection treatment) and others deemed ground water (not requiring any treatment, even disinfection), the Director may, based on site-specific considerations, allow sampling for residual disinfectant or HPC at locations other than those specified by total coliform monitoring required by R309-210-5.

R309-200-6. Secondary Drinking Water Standards for Community, Non-Transient Non-Community and Transient Non-Community Water.

The Secondary Maximum Contaminant Levels for public water systems deals with substances which affect the aesthetic quality of drinking water. They are presented here as recommended limits or ranges and are not grounds for rejection. The taste of water may be unpleasant and the usefulness of the water may be impaired if these standards are significantly exceeded.

TABLE 200-7
SECONDARY INORGANIC CONTAMINANTS

CONTAMINANT	LEVEL
Aluminum	0.05 to 0.2 mg / L
Chloride	250 mg / L
Color	15 Color units
Copper	1 mg / L
Corrosivity	Non-corrosive
Fluoride	2.0 mg / L (see note below)
Foaming Agents	0.5 mg / L
Iron	0.3 mg / L
Manganese	0.05 mg / L
Odor	3 Threshold Odor Number
pH	6.5-8.5
Silver	0.1 mg / L
Sulfate	250 mg / L (See note below)
TDS	500 mg / L (See note below)
Zinc	5 mg / L

Note: Maximum allowable Fluoride, TDS and Sulfate levels are given in the Primary Drinking Water Standards, R309-200-5(1). They are listed as secondary standards because levels in excess of these recommended levels will likely cause consumer complaint.

R309-200-7. Treatment Techniques and Unregulated Contaminants.

(1) The Board has determined that the minimum level of treatment as described in R309-525 and R309-530 herein or its equivalent is required for surface water sources and ground water contaminated by surface sources.

(2) For all public water systems which use surface water or ground water under the direct influence of surface water, R309-200, 215, 505, 510, 520, 525 and 530 establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: Giardia lamblia, viruses, heterotrophic plate count bacteria, Legionella, Cryptosporidium, and turbidity. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

(a) at least 99.9 percent (3-log) removal and/or inactivation of Giardia lamblia cysts between a point where the raw water is not subject to re-contamination by surface water runoff and a point downstream before or at the first customer;

(b) at least 99.99 percent (4-log) removal and/or inactivation of viruses between a point where the raw water is not subject to re-contamination by surface water runoff and a point downstream before or at the first customer.

(c) At least 99 percent (2-log) removal of Cryptosporidium between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

(d) Compliance with the profiling and benchmark requirements under the provisions of R309-215-14.

(3) No MCLs are established herein for unregulated contaminants; viruses, protozoans and other chemical and biological substances. Some unregulated contaminants shall be monitored for in accordance with 40 CFR 141.40.

R309-200-8. Approved Laboratories.

(1) For the purpose of determining compliance, samples may be considered only if they have been analyzed by the State of Utah primacy laboratory or a laboratory certified by the Utah State Health Laboratory. However, measurements for pH, temperature, turbidity and disinfectant residual, daily chlorite, TOC, UV254, DOC and SUVA may, under the direction of the direct responsible charge operator, be performed by any water supplier or their representative.

(2) All samples shall be marked either: routine, repeat, check or investigative before submission of such samples to a certified lab. Routine, repeat, and check samples shall be considered compliance purposes samples.

(3) All public water systems shall either: contract with a certified laboratory to have the laboratory send all compliance purposes sample results, with the exception of Lead/Copper data, to the Division of Drinking Water, or shall inform the Division of Drinking Water that they intend to forward all compliance purposes samples to the Division. Each public water system shall furnish the Division of Drinking Water a copy of the contract with their certified laboratory or inform the Division in writing of the public water system's intent to forward the data to the Division.

(4) All sample results can be sent either electronically or in hard copy form.

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R309-205. Monitoring and Water Quality: Source Monitoring Requirements.

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R309-205. Monitoring and Water Quality: Source Monitoring Requirements.

R309-205-1. Purpose.

The purpose of this rule is to outline the monitoring requirements for public water systems with regard to their water sources.

R309-205-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104 of the Utah Code and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-205-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-205-4. General.

(1) All public water systems are required to monitor their water to determine if they comply with the requirements for water quality stated in R309-200. In exceptional circumstances the Director may modify the monitoring requirements given herein as is deemed appropriate.

(2) The Director may determine compliance or initiate compliance actions based upon analytical results and other information compiled by authorized representatives.

(3) If the water fails to meet minimum standards, then certain public notification procedures shall be carried out, as outlined in R309-220. Water suppliers shall also keep analytical records in their possession, for a required length of time, as outlined in R309-105-17.

(4) All samples shall be taken at each source or point of entry to the distribution system as specified herein for each contaminant or group of contaminants.

(5) For the purpose of determining compliance, samples may only be considered if they have been analyzed by the State of Utah primacy laboratory or a laboratory certified by the Utah State Health Laboratory.

(6) Measurements for pH, temperature, turbidity and disinfectant residual may, under the direction of the direct responsible operator, be performed by any water supplier or their representative.

(7) All samples shall be marked either: routine, repeat, check or investigative before submission of such samples to a certified laboratory. Routine, repeat, and check samples shall be considered compliance purpose samples.

(8) All sample results can be sent to the Division of Drinking Water either electronically or in hard copy form.

(9) Unless otherwise required by the Director, the effective dates on which required monitoring shall be initiated are identical to the dates published in 40 CFR 141 on July 1, 2004 by the Office of the Federal Register.

(10) Exemptions from monitoring requirements shall only be granted in accordance with R309-105-5.

R309-205-5. Inorganic Contaminants.

Community, non-transient non-community, and transient non-community water systems shall conduct monitoring as specified to determine compliance with the maximum contaminant levels specified in R309-200-5 in accordance with this section.

(1) Monitoring shall be conducted as follows:

(a) Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point) beginning in the compliance period starting January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(b) Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point) beginning in the compliance period beginning January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant. (Note: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.)

(c) If a system draws water from more than one source and the sources are combined before distribution, the system shall sample at an entry point to the distribution

system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

(d) The frequency of monitoring for asbestos shall be in accordance with R309-205-5(2); the frequency of monitoring for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, sodium, sulfate, thallium, and total dissolved solids shall be in accordance with R309-205-5(3); the frequency of monitoring for nitrate shall be in accordance with R309-205-5(4); the frequency of monitoring for nitrite shall be in accordance with R309-205-5(5).

(e) Confirmation samples:

(i) Where the results of sampling for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, sulfate, thallium or total dissolved solids indicate an exceedance of the maximum contaminant level, the Director may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point.

(ii) Where nitrate or nitrite sampling results indicate an exceedance of the maximum contaminant level, the system shall take a confirmation sample within 24 hours of the system's receipt of notification of the analytical results of the first sample. Systems unable to comply with the 24-hour sampling requirement shall immediately notify the consumers in the area served by the public water system source in accordance with R309-220-5. Systems exercising this option shall take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

(iii) Procedures if the Secondary Standard for Fluoride is Exceeded Notification of State and/or Public.

If the result of an analysis indicates that the level of fluoride exceeds the Secondary Drinking Water Standard, the supplier of water shall give notice as required in R309-220-11.

(iv) The results of the initial and confirmation sample(s) taken for any contaminant, shall be averaged. The resulting average shall be used to determine the system's compliance in accordance with paragraph (1)(g) of this section. The Director has the discretion to delete results of obvious sampling errors.

(f) The Director may require more frequent monitoring than specified in paragraphs (2), (3), (4) and (5) of this section or may require confirmation samples for positive and negative results. The Director may also require an appropriate treatment process.

(g) Compliance with R309-200-5(1) shall be determined based on the analytical result(s) obtained at each sampling point.

(i) For systems which are conducting monitoring at a frequency greater than annual, compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, sulfate, thallium and total dissolved solids is determined by a running annual average at each sampling point. If the average at any sampling point is greater than the MCL, then the system is out of compliance. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any sample below the method detection limit shall be calculated at zero for the purpose of determining the annual average. If a system fails to collect the required number of samples, compliance (average concentration) shall be based on the total number of samples collected.

(ii) For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, sulfate, thallium and total dissolved solids if the level of a contaminant at any sampling point is greater than the MCL. If confirmation samples are required by the Director, the determination of compliance will be based on the annual average of the initial MCL exceedance and any Director required confirmation samples. If a system fails to collect the required number of samples, compliance (average concentration) shall be based on the total number of samples collected. If the average of the samples exceed the maximum contaminant levels then the water system shall provide public notice as required under R309-220.

(iii) Compliance with the maximum contaminant levels for nitrate and nitrite is determined based on one sample. If the levels of nitrate and/or nitrite exceed the MCLs in the initial sample, a confirmation sample is required in accordance with paragraph (1)(g)(ii) of this section, and compliance shall be determined based on the average of the initial and confirmation samples.

(iv) If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Director may allow the system to give public notice to only the area served by that portion of the system which is out of compliance.

(h) Each public water system shall monitor at the time designated by the Director during each compliance period.

(2) The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in R309-200-5(1) shall be conducted as follows:

(a) Each community and non-transient non-community water system is required to monitor for asbestos during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993.

(b) If the system believes it is not vulnerable to asbestos contamination in its source water, it may apply to the Director for a waiver of the monitoring requirement in paragraph (a) of this section. If the Director grants the waiver, the system is not required to monitor for asbestos.

(c) The Director may grant a waiver based on a consideration of the potential asbestos contamination of the water source.

(d) A waiver remains in effect until the completion of the three-year compliance period. Systems not receiving a waiver shall monitor in accordance with the provisions of paragraph (a) of this section.

(e) A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provision of R309-205-5(1).

(f) A system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe as specified in R309-210-7 shall take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

(g) A system which exceeds the maximum contaminant levels as determined in R309-205-5(1)(g) shall monitor quarterly beginning in the next quarter after the violation occurred.

(h) The Director may decrease the quarterly monitoring requirement to the frequency specified in paragraph (a) of this section provided the Director has determined that the system is reliably and consistently below the maximum contaminant level. In no case can the Director make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface (or combined surface/ground) water system takes a minimum of four quarterly samples.

(i) If monitoring data collected after January 1, 1990 are generally consistent with the requirements of R309-205-5(2), then the Director may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

(3) The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in R309-200-5(1). for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, sodium, sulfate, thallium and total dissolved solids shall be as follows:

(a) Each community and non-transient non-community groundwater system shall take one sample at each sampling point once every three years. Each community and non-transient non-community surface water system (or combined surface/ground) shall take one sample annually at each sampling point. Each transient non-community system shall take one sample for sulfate only at each sampling point once every three years for both groundwater and surface water systems.

(b) The system may apply to the Director for a waiver from the monitoring frequencies specified in paragraph (3)(a) of this section.

(c) A condition of the waiver shall require that a system shall take a minimum of one sample while the waiver is effective. The term during which the waiver is effective shall not exceed one compliance cycle (i.e., nine years).

(d) The Director may grant a waiver provided surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (At least one sample shall have been taken since January 1, 1990.) Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the maximum contaminant level. Systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the new source have been completed.

(e) In determining the appropriate reduced monitoring frequency, the Director shall consider:

(i) Reported concentrations from all previous monitoring;

(ii) The degree of variation in reported concentrations; and

(iii) Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the system's configuration, changes in the system's operating procedures, or changes in stream flows or characteristics.

(f) A decision by the Director to grant a waiver shall be made in writing and shall set forth the basis for the determination. The determination may be initiated by the Director or upon an application by the public water system. The public water system shall specify the basis for its request. The Director shall review and, where appropriate, revise its determination of the appropriate monitoring frequency when the system submits new monitoring data or when other data relevant to the system's appropriate monitoring frequency become available.

(g) Systems which exceed the maximum contaminant levels as calculated in R309-205-5(1)(g) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.

(h) The Director may decrease the quarterly monitoring requirement to the frequencies specified in paragraphs (3)(a) and (b) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case can the Director make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

(4) All public water systems (community; non-transient non-community; and transient non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrate in R309-200-5(1).

(a) Community and non-transient non-community water systems served by groundwater systems shall monitor annually beginning January 1, 1993; systems served by surface water shall monitor quarterly beginning January 1, 1993.

(b) For community and non-transient non-community water systems, the repeat monitoring frequency for ground water systems shall be quarterly for at least one year following any one sample in which the concentration is greater than or equal to 50 percent of the MCL. The Director may allow a groundwater system to reduce the sampling frequency to annually after four consecutive quarterly samples are reliably and consistently less than the MCL.

(c) For community and non-transient non-community water systems, the Director may allow a surface water system to reduce the sampling frequency to annually if all analytical results from four consecutive quarters are less than 50 percent of the MCL. A surface water system shall return to quarterly monitoring if any one sample is greater than or equal to 50 percent of the MCL.

(d) Each transient non-community water system shall monitor annually beginning January 1, 1993.

(e) After the initial round of quarterly sampling is completed, each community and non-transient non-community system which is monitoring annually shall take subsequent samples during the quarter(s) which previously resulted in the highest analytical result.

(5) All public water systems (community; non-transient non-community; and transient non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrite in R309-200-5(1).

(a) All public water systems shall take one sample at each sampling point in the compliance period beginning January 1, 1993 and ending December 31, 1995.

(b) After the initial sample, systems where an analytical result for nitrite is less than 50 percent of the MCL shall monitor at the frequency specified by the Director.

(c) For community, non-transient non-community, and transient non-community water systems, the repeat monitoring frequency for any water system shall be quarterly for at least one year following any one sample in which the concentration is greater than or equal to 50 percent of the MCL. The Director may allow a system to reduce the sampling frequency to annually after determining the system is reliably and consistently less than the MCL.

(d) Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.

R309-205-6. Organic Contaminants.

For the purposes of R309-100 through R309-605, organic chemicals are divided into three categories: Pesticides/PCBs/SOCs, volatile organic contaminants (VOCs) and total trihalomethanes.

(1) Pesticides/PCBs/SOCs monitoring requirements.

Analysis of the contaminants listed in R309-200-5(2)(a) for the purposes of determining compliance with the maximum contaminant level shall be conducted as follows:

(a) Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample shall be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(b) Surface water systems shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample shall be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant. (Note: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.)

(c) If the system draws water from more than one source and the sources are combined before distribution, the system shall sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

(d) Monitoring frequency:

(i) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in R309-200-5(2)(a) during each compliance period beginning with the compliance

period starting January 1, 1993. For systems serving less than 3,300, this requirement may be reduced to one sample if the sample is taken prior to October 1, 1993.

(ii) Systems serving more than 3,300 persons which do not detect a contaminant in the initial compliance period, may reduce the sampling frequency to a minimum of two quarterly samples in one year during each repeat compliance period.

(iii) Systems serving less than or equal to 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of one sample during each repeat compliance period.

(e) Each community and non-transient non-community water system may apply to the Director for a waiver from the requirement of paragraph (d) of this section. A system shall reapply for a waiver for each compliance period.

(f) The Director may grant: a use waiver, a susceptibility waiver or a reliably and consistently waiver. The use and susceptibility waivers shall be granted in accordance with R309-600-16. The reliably and consistently waiver shall be based on a minimum of three rounds of monitoring where the results of analysis for all constituents show that no contaminant is detected, or that the detected amount of a contaminant is less than half the MCL.

(i) If a use waiver is granted no monitoring for pesticides/PCBs/SOCs will be required, provided documentation consistent with R309-600-16 and justifying the continuance of a use waiver is submitted to the Director at least every six years.

(ii) If a susceptibility waiver or a reliably and consistently waiver is granted, monitoring for pesticides/PCBs/SOCs shall be preformed as listed below, provided documentation consistent with R309-600-16 and justifying the continuance of a susceptibility waiver is submitted to the Director at least every six years or in the case of a reliably and consistently waiver that the analytical results justify the continuance of the reliably and consistently waiver.

(A) For community and non-transient non community systems serving populations greater than 3,300 people, samples for pesticides/PCBs/SOCs shall be taken in two consecutive quarters every three years.

(B) For community and non-transient non community systems serving populations less than 3,301 people, samples for pesticides/PCBs/SOCs shall be taken every three years.

(g) If an organic contaminant listed in R309-200-5(2)(a) is detected in any sample, then:

(i) Each system shall monitor quarterly at each sampling point which resulted in a detection.

(ii) The Director may decrease the quarterly monitoring requirement specified in paragraph (g)(i) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Director make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

(iii) After the Director determines the system is reliably and consistently below the maximum contaminant level the Director may allow the system to monitor annually. Systems which monitor annually shall monitor during the quarter that previously yielded the highest analytical result.

(iv) Systems which have 3 consecutive annual samples with no detection of a contaminant may apply to the Director for a waiver as specified in paragraph (f) of this section.

(v) If monitoring results in detection of one or more of certain related contaminants (aldicarb, aldicarb sulfone, aldicarb sulfoxide and heptachlor, heptachlor epoxide), then subsequent monitoring shall analyze for all related contaminants.

(h) Systems which violate the maximum contaminant levels of R309-200-5(2)(a) as determined by paragraph (j) of this section shall monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the Director determines the system is reliably and consistently below the MCL, as specified in paragraph (j) of this section, the system shall monitor at the frequency specified in paragraph (g)(iii) of this section.

(i) The Director may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Director, the result shall be averaged with the first sampling result and the average used for the compliance determination as specified by paragraph (j) of this section. The Director has the discretion to delete results of obvious sampling errors from this calculation.

(j) Compliance with the maximum contaminant levels in R309-200-5(2)(a) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of the MCL, the system is in violation of the MCL.

(i) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.

(ii) Systems monitoring annually or less frequently whose sample result exceeds the method detection level as defined in R309-200-4(3) must begin quarterly sampling. The system shall not be considered in violation of the MCL until it has completed one year of quarterly sampling.

(iii) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.

(iv) If a system fails to collect the required number of samples, compliance shall be based on the total number of samples collected.

(v) If a sample result is less than the method detection limit, zero shall be used to calculate the annual average.

(vi) If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Director may allow the system to give public notice to only that portion of the system which is out of compliance.

(k) If monitoring data collected after January 1, 1990, are generally consistent with the other requirements of this section, then the Director may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

(l) The Director may increase the required monitoring frequency, where necessary, to detect variations within the system (e.g., fluctuations in concentration due to seasonal use, changes in water source).

(m) The Director has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

(n) Each public water system shall monitor at the time designated by the Director within each compliance period.

(2) Volatile organic contaminants monitoring requirements.

Analysis of the contaminants listed in R309-200-5(2)(b) for the purpose of determining compliance with the maximum contaminant level shall be conducted as follows:

(a) Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample shall be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant or within the distribution system.

(b) Surface water systems (or combined surface/ground) shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample shall be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.

(c) If the system draws water from more than one source and the sources are combined before distribution, the system shall sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

(d) Each community and non-transient non-community water system shall initially take four consecutive quarterly samples for each contaminant listed in R309-200-5(2)(b), Table 200-3, numbers 2 through 21 during each compliance period beginning in the initial compliance period. For systems serving a population of less than 3,300, this requirement may be reduced to one sample if the sample is taken prior to October 1, 1993.

(e) If the initial monitoring for contaminants listed in R309-200-5(2)(b), Table 200-3, numbers 2 through 21 as allowed in paragraph (n) has been completed by December 31, 1992, and the system did not detect any contaminant listed in R309-200-5(2)(b), then each ground and surface water system shall take one sample annually beginning with the initial compliance period.

(f) After a minimum of three years of annual sampling, the Director may allow groundwater systems with no previous detection of any contaminant listed in R309-200-5(2)(b) to take one sample during each compliance period.

(g) Each community and non-transient non-community water system which does not detect a contaminant listed in R309-200-5(2)(b) may apply to the Director for a waiver from the requirements of paragraph (d) and (e) of this section after completing the initial monitoring. (For the purposes of this section, detection is defined as greater than or equal to 0.0005 mg/L.) A waiver shall be effective for no more than six years (two compliance periods). The Director may also issue waivers for the initial round of monitoring for 1,2,4-trichlorobenzene.

(h) The Director may grant: a use waiver, a susceptibility waiver or a reliably and consistently waiver. The use and susceptibility waivers shall be granted in accordance with R309-600-16. The reliably and consistently waiver shall be based

on a minimum of three rounds of monitoring where the results of analysis for all constituents show that no contaminant is detected, or that the detected amount of a contaminant is less than half the MCL. To maintain a use waiver or a susceptibility waiver a system shall submit documentation consistent with R309-600-16 which justifies the continuance of a use or a susceptibility waiver at least every six years. For a reliably and consistently waiver, the analytical results for all constituents of all samples shall justify its continuance. If a waiver is granted, monitoring for VOCs will be required at least every six years.

(i) As a condition of the waiver a groundwater system shall take one sample at each sampling point during the time the waiver is effective (i.e., one sample during two compliance periods or six years) and update its source protection plan in accordance with R309-600.

(j) If a contaminant listed in R309-200-5(2)(b), Table 200-3, numbers 2 through 21 is detected at a level exceeding 0.0005 mg/L in any sample, then:

(i) The system shall monitor quarterly at each sampling point which resulted in a detection.

(ii) The Director may decrease the quarterly monitoring requirement specified in paragraph (j)(i) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Director make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

(iii) If the Director determines that the system is reliably and consistently below the MCL, the Director may allow the system to monitor annually. Systems which monitor annually shall monitor during the quarter(s) which previously yielded the highest analytical result.

(iv) Systems which have three consecutive annual samples with no detection of a contaminant may apply to the Director for a waiver as specified in paragraph (f) of this section.

(v) Groundwater systems which have detected one or more of the following two-carbon organic compounds: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, or 1,1-dichloroethylene shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two-carbon organic compounds were detected. If the results of the first analysis do not detect vinyl chloride, the Director may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance period. Surface water systems are required to monitor for vinyl chloride as specified by the Director.

(k) Systems which violate the maximum contaminant levels as required in R309-200-5(2)(b) as determined by paragraph (m) of this section shall monitor quarterly. After a minimum of four consecutive quarterly samples shows the system is in compliance as specified in paragraph (m) of this section, and the Director determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and time specified in paragraph (j)(iii) of this section.

(l) The Director may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Director, the result shall be averaged with the first sampling result and the average is used for the compliance determination as specified by paragraph (m) of this section. The Director has the discretion to delete results of obvious sampling errors from this calculation.

(m) Compliance with R309-200-5(2)(b) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of a MCL, the system is in violation of the MCL.

(i) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.

(ii) Systems monitoring annually or less frequently whose sample result exceeds the MCL must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.

(iii) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.

(iv) If a system fails to collect the required number of samples, compliance shall be based on the total number of samples collected.

(v) If a sample result is less than the method detection limit, zero shall be used to calculate the annual average.

(vi) If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Director may allow the system to give public notice to only that area served by that portion of the system which is out of compliance.

(n) The Director may allow the use of monitoring data collected after January 1, 1988 for purposes of monitoring compliance providing that the data is generally consistent with the other requirements in this section, the Director may use that data (i.e., a single sample rather than four quarterly samples) to satisfy the initial

monitoring requirement of paragraph (d) of this section. Systems which use grandfathered samples and did not detect any contaminant listed in R309-200-5(2)(b) shall begin monitoring annually in accordance with (e) of this section.

(o) The Director may increase required monitoring where necessary to detect variations within the system.

(p) Each public water system shall monitor at the time designated by the Director within each compliance period.

R309-205-7. Radiological Contaminants.

(1) Monitoring and compliance requirements for gross alpha particle activity, radium-226, radium-228, and uranium.

(a) Community water systems (CWSs) shall conduct initial monitoring to determine compliance with R309-200-5(4)(b), (c), and (e) by December 31, 2007. For the purposes of monitoring for gross alpha particle activity, radium-226, radium-228, uranium, and beta particle and photon radioactivity in drinking water, the following detection limits are established: Gross alpha particle activity - 3 pCi/L, Radium 226 - 1 pCi/L, Radium 228 - 1 pCi/L, and Uranium - reserved.

(i) Applicability and sampling location for existing community water systems or sources. All existing CWSs using ground water, surface water or systems using both ground and surface water (for the purpose of this section hereafter referred to as systems) shall sample at every entry point to the distribution system that is representative of all sources being used (hereafter called a sampling point) under normal operating conditions. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or the Director has designated a distribution system location, in accordance with paragraph (1)(b)(ii)(C) of this section.

(ii) Applicability and sampling location for new community water systems or sources. All new CWSs or CWSs that use a new source of water shall begin to conduct initial monitoring for the new source within the first quarter after initiating use of the source. CWSs shall conduct more frequent monitoring when ordered by the Director in the event of possible contamination or when changes in the distribution system or treatment processes occur which may increase the concentration of radioactivity in finished water.

(b) Initial monitoring: Systems shall conduct initial monitoring for gross alpha particle activity, radium-226, radium-228, and uranium as follows:

(i) Systems without acceptable historical data, as defined below, shall collect four consecutive quarterly samples at all sampling points before December 31, 2007.

(ii) Grandfathering of data: The Director may allow historical monitoring data collected at a sampling point to satisfy the initial monitoring requirements for that sampling point, for the following situations.

(A) To satisfy initial monitoring requirements, a community water system having only one entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.

(B) To satisfy initial monitoring requirements, a community water system with multiple entry points and having appropriate historical monitoring data for each entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.

(C) To satisfy initial monitoring requirements, a community water system with appropriate historical data for a representative point in the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003, provided that the Director finds that the historical data satisfactorily demonstrate that each entry point to the distribution system is expected to be in compliance based upon the historical data and reasonable assumptions about the variability of contaminant levels between entry points. The Director shall make a written finding indicating how the data conforms to these requirements.

(iii) For gross alpha particle activity, uranium, radium-226, and radium-228 monitoring, the Director may waive the final two quarters of initial monitoring for a sampling point if the results of the samples from the previous two quarters are below the detection limit.

(iv) If the average of the initial monitoring results for a sampling point is above the MCL, the system shall collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are at or below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the Director.

(c) Reduced monitoring: The Director may allow community water systems to reduce the future frequency of monitoring from once every three years to once every six or nine years at each sampling point, based on the following criteria.

(i) If the average of the initial monitoring results for each contaminant (i.e., gross alpha particle activity, uranium, radium-226, or radium-228) is below the detection limit specified in paragraph (1)(a) of this section, the system shall collect and analyze for that contaminant using at least one sample at that sampling point every nine years.

(ii) For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is at or above the detection limit but at or below 1/2 the MCL, the system shall collect and analyze for that contaminant using at least one sample at that sampling point every six years. For combined radium-226 and radium-228, the analytical results shall be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is at or above the detection limit but at or below 1/2 the MCL, the system shall collect and analyze for that contaminant using at least one sample at that sampling point every six years.

(iii) For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above 1/2 the MCL but at or below the MCL, the system shall collect and analyze at least one sample at that sampling point every three years. For combined radium-226 and radium-228, the analytical results shall be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is above 1/2 the MCL but at or below the MCL, the system shall collect and analyze at least one sample at that sampling point every three years.

(iv) Systems shall use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods (e.g., if a system's sampling point is on a nine year monitoring period, and the sample result is above 1/2 MCL, then the next monitoring period for that sampling point is three years).

(v) If a system has a monitoring result that exceeds the MCL while on reduced monitoring, the system shall collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the Director.

(d) Compositing: To fulfill quarterly monitoring requirements for gross alpha particle activity, radium-226, radium-228, or uranium, a system may composite up to four consecutive quarterly samples from a single entry point if analysis is done within a year of the first sample. The Director will treat analytical results from the composited as the average analytical result to determine compliance with the MCLs and the future monitoring frequency. If the analytical result from the composited sample is greater than 1/2 MCL, the Director may direct the system to take additional quarterly samples before allowing the system to sample under a reduced monitoring schedule.

(e) A gross alpha particle activity measurement may be substituted for the required radium-226 measurement provided that the measured gross alpha particle activity does not exceed 5 pCi/l. A gross alpha particle activity measurement may be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/l.

(f) The gross alpha measurement shall have a confidence interval of 95% (1.65s, where s is the standard deviation of the net counting rate of the sample) for radium-226 and uranium. When a system uses a gross alpha particle activity measurement in lieu of a radium-226 and/or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring frequency for radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, 1/2 the detection limit will be used to determine compliance and the future monitoring frequency.

(2) Monitoring and compliance requirements for beta particle and photon radioactivity. To determine compliance with the maximum contaminant levels in R309-200-5(4)(d) for beta particle and photon radioactivity, a system shall monitor at a frequency as follows:

(a) Community water systems (both surface and ground water) designated by the Director as vulnerable shall sample for beta particle and photon radioactivity. Systems shall collect quarterly samples for beta emitters and annual samples for tritium and strontium-90 at each entry point to the distribution system (hereafter called a sampling point), beginning within one quarter after being notified by the Director. Systems already designated by the Director shall continue to sample until the Director reviews and either reaffirms or removes the designation. The following detection limits are established: Tritium - 1,000 pCi/l; Strontium-89 - 10 pCi/l; Strontium-90 - 2 pCi/l; Iodine-131 - 1 pCi/l; Cesium-134 - 10 pCi/l; Gross beta - 4 pCi/l; and other radionuclides (1/10) of the applicable limit.

(i) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 50 pCi/L (screening level), the Director may reduce the frequency of monitoring at that sampling point to once every 3 years. Systems shall collect all samples required in paragraph (2)(a) of this section during the reduced monitoring period.

(ii) For systems in the vicinity of a nuclear facility, the Director may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the Director determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems which are using surveillance data shall begin monitoring at the community water system's entry point(s) in accordance with paragraph (2)(a) of this section.

(b) Community water systems (both surface and ground water) designated by the Director as utilizing waters contaminated by effluents from nuclear facilities shall sample for beta particle and photon radioactivity. Systems shall collect quarterly samples for beta emitters and iodine-131 and annual samples for tritium and strontium-90 at each entry point to the distribution system (hereafter called a sampling point), beginning within one quarter after being notified by the Director. Systems already designated by the Director as systems using waters contaminated by effluents from nuclear facilities shall continue to sample until the Director reviews and either reaffirms or removes the designation.

(i) Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples or the analysis of a composite of three monthly samples. The former is recommended.

(ii) For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. As ordered by the Director, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water.

(iii) Annual monitoring for strontium-90 and tritium shall be conducted by means of the analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. The latter procedure is recommended.

(iv) If the gross beta particle activity beta minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly)less than or equal to 15 pCi/L, the Director may reduce the frequency of monitoring at that sampling point to every 3 years. Systems shall collect all samples required in paragraph (2)(b) of this section during the reduced monitoring period.

(v) For systems in the vicinity of a nuclear facility, the Director may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the Director determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems which are using surveillance data shall begin monitoring at the community water system's entry point(s) in accordance with paragraph (2)(b) of this section.

(c) Community water systems designated by the Director to monitor for beta particle and photon radioactivity can not apply to the Director for a waiver from the monitoring frequencies specified in paragraph (2)(a) or (2)(b) of this section.

(d) Community water systems may analyze for naturally occurring potassium-40 beta particle activity from the same or equivalent sample used for the gross beta particle activity analysis. Systems are allowed to subtract the potassium-40 beta particle activity value from the total gross beta particle activity value to determine if

the screening level is exceeded. The potassium-40 beta particle activity shall be calculated by multiplying elemental potassium concentrations (in mg/L) by a factor of 0.82.

(e) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity exceeds the screening level, an analysis of the sample shall be performed to identify the major radioactive constituents present in the sample and the appropriate doses shall be calculated and summed to determine compliance with R309-200-5(4)(d)(i), using the formula in R309-200-5(4)(d)(ii). Doses shall also be calculated and combined for measured levels of tritium and strontium to determine compliance.

(f) Systems shall monitor monthly at the sampling point(s) which exceed the maximum contaminant level in R309-200-5(4)(d) beginning the month after the exceedance occurs. Systems shall continue monthly monitoring until the system has established, by a rolling average of 3 monthly samples, that the MCL is being met. Systems who establish that the MCL is being met shall return to quarterly monitoring until they meet the requirements set forth in paragraph (2)(a)(ii) or (2)(b)(i) of this section.

(3) General monitoring and compliance requirements for radionuclides.

(a) The Director may require more frequent monitoring than specified in paragraphs (1) and (2) of this section, or may require confirmation samples at its discretion. The results of the initial and confirmation samples will be averaged for use in compliance determinations.

(b) Each public water system shall monitor at the time designated by the Director during each compliance period.

(c) Compliance: Compliance with R309-200-5(4) (b) through (e) will be determined based on the analytical result(s) obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.

(i) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point. If the average of any sampling point is greater than the MCL, then the system is out of compliance with the MCL.

(ii) For systems monitoring more than once per year, if any sample result will cause the running average to exceed the MCL at any sample point, the system is out of compliance with the MCL immediately.

(iii) Systems shall include all samples taken and analyzed under the provisions of this section in determining compliance, even if that number is greater than the minimum required.

(iv) If a system does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance will be based on the running average of the samples collected.

(v) If a sample result is less than the detection limit, zero will be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, 1/2 the detection limit will be used to calculate the annual average.

(d) The Director has the discretion to delete results of obvious sampling or analytic errors.

(e) If the MCL for radioactivity set forth in R309-200-5(4)(b) through (e) is exceeded, the operator of a community water system shall give notice to the Director pursuant to R309-105-16 and to the public as required by R309-220.

(f) To judge compliance with the maximum contaminant levels listed in R309-200-5(4), averages of data shall be used and shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.

R309-205-8. Turbidity.

(1) Routine Monitoring Requirements for Public Water Systems utilizing Ground Water Sources

The frequency of required turbidity monitoring or the lack of any required monitoring listed below may be increased or changed by the Director. Monitoring and reporting of water characteristics such as turbidity, conductivity, pH, and temperature of ground water sources and nearby surface water sources may be required so as to provide sufficient information on water characteristics so that the Director may classify existing ground water sources as required by R309-505-7(1)(a)(i)(A).

(a) All community water systems shall monitor ground water sources for turbidity once every three years.

(b) Non-transient non-community water systems are not required to monitor ground water sources for turbidity unless so ordered by the Director.

(c) Transient non-community water systems are not required to monitor ground water sources for turbidity unless so ordered by the Director.

(d) Samples may be taken from a representative location in the distribution system. However, the Director may require that samples be collected from each individual source.

(2) Procedures if Ground Water Source Turbidity Limit is Exceeded

If the result of an analysis of water from a ground water source or combination of ground water sources indicates that the turbidity limit of 5 NTUs is exceeded, the system shall collect three additional analyses at the same sampling point within one month. When the average of these four analyses (rounded to the same number of significant figures as the limit) exceeds the maximum turbidity limit, the system shall give public notice as required in R309-220. Where the raw water turbidity of developed spring or well water is in excess of 5 NTU, as measured by the average of the four samples, the spring or well is subject to re-classification by the Director and it may be necessary that the raw water receive complete treatment as described in R309-525 or R309-530 of these rules or its equivalent as approved by the Director. Monitoring after public notification shall be at a frequency and duration designated by the Director.

(3) Turbidity monitoring requirements for surface water and ground water sources under the direct influence of surface water are specified in R309-215-9.

R309-205-9. Microbiological Contaminants.

(1) Sources may be required to monitor for microbial contaminants elsewhere in these rules. For example see R309-215-16(1)(a)(ii) and R309-215-16(2).

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R309-210. Monitoring and Water Quality: Distribution System Monitoring Requirements.

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R309-210. Monitoring and Water Quality: Distribution System Monitoring Requirements.

R309-210-1. Purpose.

The purpose of this rule is to outline the monitoring requirements for public water systems with regard to their distribution systems.

R309-210-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104 of the Utah Code and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-210-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-210-4. General.

(1) All public water systems are required to monitor their water to determine if they comply with the requirements for water quality stated in R309-200. In exceptional circumstances the Director may modify the monitoring requirements given herein as is deemed appropriate.

(2) The Director may determine compliance or initiate compliance actions based upon analytical results and other information compiled by authorized representatives.

(3) If the water fails to meet minimum standards, then certain public notification procedures must be carried out, as outlined in R309-220. Water suppliers must also keep analytical records in their possession, for a required length of time, as outlined in R309-105-17.

(4) All samples shall be taken at representative sites as specified herein for each contaminant or group of contaminants.

(5) For the purpose of determining compliance, samples may only be considered if they have been analyzed by the State of Utah primacy laboratory or a laboratory certified by the Utah State Health Laboratory.

(6) Measurements for pH, temperature, turbidity and disinfectant residual may, under the direction of the direct responsible operator, be performed by any water supplier or their representative.

(7) All samples must be marked either: routine, repeat, check or investigative before submission of such samples to a certified laboratory. Routine, repeat, and check samples shall be considered compliance purpose samples.

(8) All sample results can be sent to the Division of Drinking Water either electronically or in hard copy form.

(9) Lead and Copper data must be submitted to the Division of Drinking Water using forms provided by the Division.

(10) Unless otherwise required by the Director, the effective dates on which required monitoring shall be initiated are identical to the dates published in 40 CFR 141 on July 1, 2001 by the Office of the Federal Register.

(11) Exemptions from monitoring requirements shall only be granted in accordance with R309-105-5.

R309-210-5. Microbiological Monitoring.

(1) Routine Microbiological Monitoring Requirements Applicable to all public water systems (community, non-transient non-community and transient non-community).

(a) Community water systems shall monitor for total coliforms at a frequency based on the population served, as follows:

TABLE 210-1
TOTAL COLIFORM MONITORING FREQUENCYFOR PUBLIC WATER SYSTEMS

Population served	Minimum number of samples per month
25 to 1,000	1
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8

7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240
780,001 to 970,000	270
970,001 to 1,230,000	300
1,230,001 to 1,520,000	330
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450
3,960,001 or more	480
Note: The 25 - 1,000 population figure includes public water systems which have at least 15 service connections, but serve fewer than 25 persons.	

(b) Non-transient non-community water systems shall monitor for total coliforms as follows:

(i) A system using only ground water (except ground water under the direct influence of surface water) and serving 1,000 or fewer shall monitor each calendar quarter that the system provides water to the public.

(ii) A system using only ground water (except ground water under the direct influence of surface water) and serving more than 1,000 persons during any month shall monitor at the same frequency as a like-sized community water system, as specified in Table 210-1. The Director may reduce the monitoring frequency for any month the system serves 1,000 persons or fewer. In no case may the required monitoring be reduced to less than once per calendar quarter.

(iii) A system using surface water, in total or in part, shall monitor at the same frequency as a like-sized community water system, as specified in Table 210-1.

(iv) A system using ground water under the direct influence of surface water shall monitor at the same frequency as a like-sized community water system, as specified in Table 210-1. The system shall begin monitoring at this frequency beginning six months after the Director determines that the ground water is under the direct influence of surface water.

(c) Non-community water systems shall monitor for total coliforms as specified in R309-210-5(1)(b).

(d) The samples shall be collected at points which are representative of water throughout the distribution system according to a written sampling plan. This plan is subject to the approval of the Director.

(e) A public water system shall collect samples at regular time intervals throughout the month, except that a system which uses only ground water (except ground water under the direct influence of surface water) and serves 4,900 persons or fewer, may collect all required samples on a single day if they are taken from different sites.

(f) A public water system that uses inadequately treated surface water or inadequately treated ground water under the direct influence of surface water shall collect and analyze for total coliforms at least one sample each day the turbidity level of the source water exceeds 1 NTU. This sample shall be collected near the first service connection from the source. The system shall collect the sample within 24 hours of the time when the turbidity level was first exceeded. The sample shall be analyzed within 30 hours of collection. Sample results from this coliform monitoring shall be included in determining total coliform compliance for that month. The Director may extend the 24 hour limitation if the system has a logistical problem that is beyond the system's control. In the case of an extension the Director shall specify how much time the system has to collect the sample.

(2) Procedures if a Routine Sample is Total Coliform-Positive

(a) Repeat sampling -

The water system shall collect a set of repeat samples within 24 hours of being notified of the total coliform-positive sample result. The number of repeat samples required to be taken is specified in Table 210-2. The Director may extend the 24 hour limitation if the system has a logistical problem that is beyond its control. In the case of an extension the Director shall specify how much time the system has to collect the repeat samples.

TABLE 210-2 REPEAT AND ADDITIONAL SAMPLE MONITORING FREQUENCY			
Population Served by the System	# Routine Samples per Month	# Repeats for Each Total Coliform Sample Within 24 Hours	Number of Samples in ADDITION to the Routine Samples the Following Month
25-1000 (See Note 1 below	1	4	4
100-2500	2	3	3
2501-3300	3	3	2
3301-4100	4	3	1
Greater Than 4100	5 or more	3	No Additional Samples Required. Refer to Table 210-1 for # of Routine Samples
NOTE 1: The population category 25 - 1000 includes all non-transient non-community and non-community water systems. Non-transient non-community and non-community systems are only are required to sample once per calendar quarter on a routine basis for those quarters the system is in operation. Repeat and Additional Routine samples are only required if a Routine Sample is Total Coliform-Positive.			

(b) Repeat sampling locations -

The system shall collect the repeat samples from the following locations:

(i) One from the original sample site;

(ii) One within 5 service connections upstream;

(iii) One within 5 service connections downstream;

(iv) If required, one from any site mentioned above.

If a total coliform-positive sample is at the end of the distribution system, or next to the end of the distribution system, the Director may waive the requirement to collect at least one repeat sample upstream or downstream of the original sampling site.

(c) The system shall collect all repeat samples on the same day, except that the Director may allow a system with a single service connection to collect the required set of repeat samples on consecutive days.

(d) Additional repeat samples - If one or more repeat samples in a set is total coliform-positive, the system shall collect an additional set of repeat samples as specified in (a), (b) and (c) of this subsection. The additional repeat samples shall be collected within 24 hours of being notified of the positive result, unless the Director extends the time limit because of a logistical problem. The system shall repeat this process until either total coliforms are not detected in one complete set of repeat samples or the system determines that the total coliform MCL has been exceeded and notifies the Director and begins the required public notification.

(e) If a system collecting fewer than five routine samples per month has one or more total coliform-positive samples and the Director does not invalidate the sample under R309-210-5(4), it shall collect at least five routine samples during the next month the system provides water to the public. Refer to Table 210-2 for the number of additional samples required.

(i) The Director may waive the requirement to collect five routine samples the next month the system provides water to the public if the Director has determined why the sample was total coliform-positive and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. In this case:

(A) The Director shall document this decision in writing; and

(B) The Director or his representative shall sign the document; and

(C) The Director will make the document available to the EPA and the public.

(ii) The Director cannot waive the additional samples in the following month solely because all repeat samples are total coliform-negative.

(iii) If the additional samples in the following month are waived, a system shall still take the minimum number of routine samples required in Table 210-1 of R309-210-5(1) before the end of the next month and use it to determine compliance with the total coliform MCL.

(f) Samples to be included in calculations - Results of all routine and repeat samples not invalidated in writing by the Director shall be included in determining compliance with the total coliform MCL.

(g) Samples not to be included in calculations - Special purpose and investigative samples, such as those taken to determine the efficiency of disinfection practices following such operations as pipe replacement or repair, may not be used to determine compliance with the MCL for total coliforms. These samples shall be identified as special purpose or investigative at the time of collection.

(3) Response to violation

(a) A public water system which has exceeded the MCL for total coliforms as specified in R309-200-5(6) shall report the violation to the Director no later than the end of the next business day after it learns of the violation, and notify the public in accordance with R309-220.

(b) A public water system which has failed to comply with a coliform monitoring requirement shall report the monitoring violation to the Director within ten days after the system discovers the violation and notify the public in accordance with R309-220.

(4) Invalidation of Total Coliform-Positive Samples

An invalidated total coliform-positive sample does not count towards meeting the minimum monitoring requirements of R309-210-5(1) and R309-210-5(2). A total coliform-positive sample may not be invalidated solely on the basis of all repeat samples being total coliform-negative.

(a) The Director may invalidate a total coliform-positive sample only if one of the following conditions are met:

(i) The laboratory establishes that improper sample analysis caused the total coliform-positive result; or

(ii) On the basis of the results of repeat samples collected as required in R309-210-5(2), the total coliform-positive sample resulted from a non-distribution system plumbing problem on the basis that all repeat samples taken at the same tap as the original total coliform-positive are total coliform-positive, but all repeat samples within five service connections are total coliform-negative; or

(iii) Substantial grounds exist to establish that the total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case:

(A) The Director shall document this decision in writing; and

(B) The Director or his representative shall sign the document; and

(C) The Director will make the document available to the EPA and the public. The system shall still collect the required repeat samples

as outlined in R309-210-5(2) in order to determine compliance with the MCL.

(b) A laboratory shall invalidate a total coliform sample (unless total coliforms are detected) if the results are indeterminate because of possible interference. A system shall collect and have analyzed, another total coliform sample from the same location as the original sample within 24 hours of being notified of the indeterminate result. The system shall continue to resample within 24 hours of notification of indeterminate results and have the samples analyzed until a valid sample result is obtained. The 24-hour time limit may be waived by the Director on a case-by-case basis if the system has logistical problems beyond its control. Interference for each type of analysis is listed below.

(i) The sample produces a turbid culture in the absence of gas production when using an analytical method where gas formation is examined.

(ii) The sample produces a turbid culture in the absence of an acid reaction when using the Presence-Absence Coliform Test.

(iii) The sample exhibits confluent growth or produces colonies too numerous to count when using an analytical method using a membrane filter.

(5) Fecal coliforms/Escherichia coli (E. coli) testing

(a) If any routine sample, repeat sample or additional sample is total coliform-positive, the system shall have the total coliform-positive culture medium analyzed to determine if fecal coliforms are present. The system may test for E. coli in lieu of fecal coliforms.

(b) Notification of Director and public - If fecal coliforms or E. coli are confirmed present (as per R309-200-5(6)(b)), the system shall notify the Director by the end of the day when the system is notified of the test results. If the system is notified after the Division of Drinking Water has closed, the system shall notify the Director before the close of the next business day and begin public notification using the mandatory health effects language R309-220) within 72 hours.

(c) The Director may allow a system to forego the analysis for fecal coliforms or E. coli, if the system assumes that the total coliform positive sample is fecal coliform-positive or E. coli-positive. The system must notify the Director of this decision and begin the required public notification.

(6) Best Available Technology

The Director may require an appropriate treatment process using the best available technology (BAT) in order to bring the water into compliance with the maximum contaminant level for microbiological quality. The BAT will be determined by the Director.

R309-210-6. Lead and Copper Monitoring.

(1) General requirements.

(a) Applicability and effective dates

(i) The requirements of R309-210-6. unless otherwise indicated, apply to community water systems and non-transient non-community water systems (hereinafter referred to as water systems or systems).

(b) R309-210-6 establishes a treatment technique that includes requirements for corrosion control treatment, source water treatment, lead service line replacement, and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples collected at consumers' taps.

(c) Corrosion control treatment requirements

(i) All water systems shall install and operate optimal corrosion control treatment. However, any water system that complies with the applicable corrosion control treatment requirements specified by the Director under R309-210-6(2) and R309-210-6(4)(a) shall be deemed in compliance with this treatment requirement.

(d) Source water treatment requirements

Any system exceeding the lead or copper action level shall implement all applicable source water treatment requirements specified by the Director under R309-210-6(4)(b).

(e) Lead service line replacement requirements

Any system exceeding the lead action level after implementation of applicable corrosion control and source water treatment requirements shall complete the lead service line replacement requirements contained in R309-210-6(4)(c).

(f) Public education requirements

Pursuant to R309-210-6(7), all water systems must provide a consumer notice of lead tap water monitoring results to persons served at the sites (taps) that are tested.

Any system exceeding the lead action level shall implement the public education requirements.

(g) Monitoring and analytical requirements

Tap water monitoring for lead and copper, monitoring for water quality parameters, source water monitoring for lead and copper, and analyses of the monitoring results shall be completed in compliance with R309-210-6(3), R309-210-6(5), R309-210-6(6) and R309-200-8.

(h) Reporting requirements

Systems shall report to the Director any information required by the treatment provisions of this subpart and R309-210-6(8).

(i) Recordkeeping requirements

Systems shall maintain records in accordance with R309-105-17(2).

(j) Violation of primary drinking water rules

Failure to comply with the applicable requirements of R309-210-6., including requirements established by the Director pursuant to these provisions, shall constitute a violation of the primary drinking water regulations for lead and/or copper.

(2) Applicability of corrosion control treatment steps to small, medium-size and large water systems.

(a) Systems shall complete the applicable corrosion control treatment requirements described in R309-210-6(4)(a) by the deadlines established in this section.

(i) A large system (serving greater than 50,000 persons) shall complete the corrosion control treatment steps specified in R309-210-6(2)(d), unless it is deemed to have optimized corrosion control under R309-210-6(2)(b)(ii) or (b)(iii).

(ii) A small system (serving less than 3300 persons) and a medium-size system (serving greater than 3,300 and less than 50,000 persons) shall complete the corrosion control treatment steps specified in R309-210-6(2)(e), unless it is deemed to have optimized corrosion control under R309-210-6(2)(b)(i), (b)(ii), or (b)(iii).

(b) A system is deemed to have optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in this section if

the system satisfies one of the criteria in paragraphs (b)(i) through (b)(iii) of this section. Any such system deemed to have optimized corrosion control under this paragraph, and which has treatment in place, shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the Director determines appropriate to ensure optimal corrosion control treatment is maintained.

(i) A small or medium-size water system is deemed to have optimized corrosion control if the system meets the lead and copper action levels during each of two consecutive six-month monitoring periods conducted in accordance with R309-210-6(3).

(ii) Any water system may be deemed by the Director to have optimized corrosion control treatment if the system demonstrates to the satisfaction of the Director that it has conducted activities equivalent to the corrosion control steps applicable to such system under this section. If the Director makes this determination, it shall provide the system with written notice explaining the basis for its decision and shall specify the water quality control parameters representing optimal corrosion control in accordance with R309-210-6(4)(a)(vi). Water systems deemed to have optimized corrosion control under this paragraph shall operate in compliance with the Director designated optimal water quality control parameters in accordance with R309-210-6(4)(a)(vii) and continue to conduct lead and copper tap and water quality parameter sampling in accordance with R309-210-6(3)(d)(iii) and R309-210-6(5)(d), respectively. A system shall provide the Director with the following information in order to support a determination under this paragraph:

(A) the results of all test samples collected for each of the water quality parameters in R309-210-6(4)(a)(iii)(C).

(B) a report explaining the test methods used by the water system to evaluate the corrosion control treatments listed in R309-210-6(4)(a)(iii)(A), the results of all tests conducted, and the basis for the system's selection of optimal corrosion control treatment;

(C) a report explaining how corrosion control has been installed and how it is being maintained to insure minimal lead and copper concentrations at consumers' taps; and

(D) the results of tap water samples collected in accordance with R309-210-6(3) at least once every six months for one year after corrosion control has been installed.

(iii) Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with R309-210-6(3) and source water monitoring conducted in accordance with R309-

210-6(6) that demonstrates for two consecutive six-month monitoring periods that the difference between the 90th percentile tap water lead level computed under R309-200-5(2)(c), and the highest source water lead concentration, is less than the Practical Quantitation Level (PQL) for lead as specified in R309-104-8.

(A) Those systems whose highest source water lead level is below the Method Detection Limit may also be deemed to have optimized corrosion control under this paragraph if the 90th percentile tap water lead level is less than or equal to the Practical Quantitation Level for lead for two consecutive 6-month monitoring periods.

(B) Any water system deemed to have optimized corrosion control in accordance with this paragraph shall continue monitoring for lead and copper at the tap no less frequently than once every three calendar years using the reduced number of sites specified in R309-210-6(3)(c) and collecting the samples at times and locations specified in R309-210-6(3)(d)(iv)(D). Any such system that has not conducted a round of monitoring pursuant to R309-210-6(3)(d) since September 30, 1997, shall complete a round of monitoring pursuant to this paragraph no later than September 30, 2000.

(C) Any water system deemed to have optimized corrosion control pursuant to this paragraph shall notify the Director in writing pursuant to R309-210-6(8)(a)(iii) of any upcoming long-term change in treatment or addition of a new source as described in that section. The Director must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The Director may require any such system to conduct additional monitoring or to take other action the Director deems appropriate to ensure that such systems maintain minimal levels of corrosion in the distribution system.

(D) As of July 12, 2001, a system is not deemed to have optimized corrosion control under this paragraph, and shall implement corrosion control treatment pursuant to paragraph (b)(iii)(E) of this section unless it meets the copper action level.

(E) Any system triggered into corrosion control because it is no longer deemed to have optimized corrosion control under this paragraph shall implement corrosion control treatment in accordance with the deadlines in paragraph (e) of this section. Any such large system shall adhere to the schedule specified in that paragraph for medium-size systems, with the time periods for completing each step being triggered by the date the system is no longer deemed to have optimized corrosion control under this paragraph.

(c) Any small or medium-size water system that is required to complete the corrosion control steps due to its exceedance of the lead or copper action level may cease completing the treatment steps whenever the system meets both action levels during each of two consecutive monitoring periods conducted pursuant to R309-210-6(3) and submits the results to the Director. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the system (or the Director, as the case may be) shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety. The Director may require a system to repeat treatment steps previously completed by the system where the Director determines that this is necessary to implement properly the treatment requirements of this section. The Director shall notify the system in writing of such a determination and explain the basis for its decision. The requirement for any small or medium size system to implement corrosion control treatment steps in accordance with paragraph (e) of this section (including systems deemed to have optimized corrosion control under paragraph (b)(i) of this section) is triggered whenever any small or medium size system exceeds the lead or copper action level.

(d) Treatment steps and deadlines for large systems

Except as provided in R309-210-6(2)(b)(ii) and (b)(iii), large systems shall complete the following corrosion control treatment steps by the indicated dates.

(i) Step 1: The system shall conduct initial monitoring (R309-210-6(3)(d)(i) and R309-210-6(5)(b)) during two consecutive six-month monitoring periods by January 1, 1993.

(ii) Step 2: The system shall complete corrosion control studies (R309-210-6(4)(a)(iii)) by July 1, 1994.

(iii) Step 3: The Director shall designate optimal corrosion control treatment (R309-210-6(4)(a)(iv)) by January 1, 1995.

(iv) Step 4: The system shall install optimal corrosion control treatment (R309-210-6(4)(a)(v)) by January 1, 1997.

(v) Step 5: The system shall complete follow-up sampling (R309-210-6(3)(d)(ii) and R309-210-6(5)(c)) by January 1, 1998.

(vi) Step 6: The Director shall review installation of treatment and designate optimal water quality control parameters (R309-210-6(4)(a)(vi)) by July 1, 1998.

(vii) Step 7: The system shall operate in compliance with the Director specified optimal water quality control parameters (R309-210-6(4)(a)(vii))

and continue to conduct tap sampling (R309-210-6(3)(d)(iii) and R309-210-6(5)(d)).

(e) Treatment steps and deadlines for small and medium-size systems

Except as provided in R309-210-6(2)(b), small and medium-size systems shall complete the following corrosion control treatment steps by the indicated time periods.

(i) Step 1: The system shall conduct initial tap sampling (R309-210-6(3)(d)(i) and R309-210-6(5)(b) until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under R309-210-6(3)(d)(iv). A system exceeding the lead or copper action level shall recommend optimal corrosion control treatment (R309-210-6(4)(a)) within six months after the end of the monitoring period during which it exceeds one of the action levels.

(ii) Step 2: Within 12 months after the end of the monitoring period during which a system exceeds the lead or copper action level, the Director may require the system to perform corrosion control studies (R309-210-6(4)(b)). If the Director does not require the system to perform such studies, the Director shall specify optimal corrosion control treatment (R309-210-6(4)(a)(iv)) within the following time-frames:

(A) for medium-size systems, within 18 months after the end of the monitoring period during which such system exceeds the lead or copper action level,

(B) for small systems, within 24 months after the end of the monitoring period during which such system exceeds the lead or copper action level.

(iii) Step 3: If the Director requires a system to perform corrosion control studies under step 2, the system shall complete the studies (R309-210-6(4)(a)(iii)) within 18 months after the Director requires that such studies be conducted.

(iv) Step 4: If the system has performed corrosion control studies under step 2, the Director shall designate optimal corrosion control treatment (R309-210-6(4)(a)(iv)) within 6 months after completion of step 3.

(v) Step 5: The system shall install optimal corrosion control treatment (R309-210-6(4)(a)(v)) within 24 months after the Director designates such treatment.

(vi) Step 6: The system shall complete follow-up sampling (R309-210-6(3)(d)(ii) and R309-210-6(5)(c)) within 36 months after the Director designates optimal corrosion control treatment.

(vii) Step 7: The Director shall review the system's installation of treatment and designate optimal water quality control parameters (R309-210-6(4)(a)(vi)) within 6 months after completion of step 6.

(viii) Step 8: The system shall operate in compliance with the Director-designated optimal water quality control parameters (R309-210-6(4)(a)(vii)) and continue to conduct tap sampling (R309-210-6(3)(d)(iii) and R309-210-6(5)(d)).

(3) Monitoring requirements for lead and copper in tap water.

(a) Sample site location

(i) By the applicable date for commencement of monitoring under R309-210-6(3)(d)(i), each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of this section, and which is sufficiently large to ensure that the water system can collect the number of lead and copper tap samples required in R309-210-6(3)(c). All sites from which first draw samples are collected shall be selected from this pool of targeted sampling sites. Sampling sites may not include faucets that have point-of-use or point-of-entry treatment devices designed to remove inorganic contaminants.

(ii) A water system shall use the information on lead, copper, and galvanized steel when conducting a materials evaluation. When an evaluation of this information is insufficient to locate the requisite number of lead and copper sampling sites that meet the targeting criteria in R309-210-6(3)(a), the water system shall review the sources of information listed below in order to identify a sufficient number of sampling sites. In addition, the system shall seek to collect such information where possible in the course of its normal operations (e.g., checking service line materials when reading water meters or performing maintenance activities):

(A) all plumbing codes, permits, and records in the files of the building department(s) which indicate the plumbing materials that are installed within publicly and privately owned structures connected to the distribution system;

(B) all inspections and records of the distribution system that indicate the material composition of the service connections that connect a structure to the distribution system; and

(C) all existing water quality information, which includes the results of all prior analyses of the system or individual structures connected to the system, indicating locations that may be particularly susceptible to high lead or copper concentrations.

(iii) The sampling sites selected for a community water system's sampling pool ("tier 1 sampling sites") shall consist of single family structures that:

(A) contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

(B) are served by a lead service line.

When multiple-family residences comprise at least 20 percent of the structures served by a water system, the system may include these types of structures in its sampling pool.

(iv) Any community water system with insufficient tier 1 sampling sites shall complete its sampling pool with "tier 2 sampling sites", consisting of buildings, including multiple-family residences that:

(A) contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

(B) are served by a lead service line.

(v) Any community water system with insufficient tier 1 and tier 2 sampling sites shall complete its sampling pool with "tier 3 sampling sites", consisting of single family structures that contain copper pipes with lead solder installed before 1983. A community water system with insufficient tier 1, tier 2 and tier 3 sampling sites shall complete its sampling pool with representative sites throughout the distribution system. For the purpose of this paragraph, a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

(vi) The sampling sites selected for a non-transient non-community water system ("tier 1 sampling sites") shall consist of buildings that:

(A) contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

(B) are served by a lead service line.

(vii) A non-transient non-community water system with insufficient tier 1 sites that meet the targeting criteria in R309-210-6(3)(a)(vi) shall complete its sampling pool with sampling sites that contain copper pipes with lead solder installed before 1983. If additional sites are needed to complete its sampling pool, the non-transient non-community water system shall use representative sites throughout the distribution system. For the purpose of this paragraph, a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

(viii) Any water system whose distribution system contains lead service lines shall draw 50 percent of the samples it collects during each monitoring period from sites that contain lead pipes, or copper pipes with lead solder, and 50 percent of the samples from sites served by a lead service line. A water system that cannot identify a sufficient number of sampling sites served by a lead service line shall collect first draw samples from all of the sites identified as being served by such lines.

(b) Sample collection methods

(i) All tap samples for lead and copper collected in accordance with this section, with the exception of lead service line samples collected under R309-210-6(4)(c)(iii) and samples collected under (b)(v) of this section, shall be first draw samples.

(ii) Each first-draw tap sample for lead and copper shall be one liter in volume and have stood motionless in the plumbing system of each sampling site for at least six hours. First draw samples from residential housing shall be collected from the cold water kitchen tap or bathroom sink tap. First-draw samples from a nonresidential building shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. Non-first-draw samples collected in lieu of first-draw samples pursuant to paragraph (b)(v) of this section shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. First draw samples may be collected by the system or the system may allow residents to collect first draw samples after instructing the residents of the sampling procedures specified in this paragraph. To avoid problems with residents handling nitric acid, acidification of first draw samples may be done up to fourteen days after the sample is collected. After acidification to resolubilize the metals, the sample must stand in the original container for the time specified in R309-200-4(3). If a system allows residents to perform sampling, the system may not challenge, based on alleged errors in sample collection, the accuracy of sampling results.

(iii) Each service line sample shall be one liter in volume and have stood motionless in the lead service line for at least six hours. Lead service line samples shall be collected in one of the following three ways:

(A) at the tap after flushing the volume of water between the tap and the lead service line. The volume of water shall be calculated based on the interior diameter and length of the pipe between the tap and the lead service line;

(B) tapping directly into the lead service line; or

(C) if the sampling site is a building constructed as a single-family residence, allowing the water to run until there is a significant change in temperature which would be indicative of water that has been standing in the lead service line.

(iv) A water system shall collect each first draw tap sample from the same sampling site from which it collected a previous sample. If, for any reason, the water system cannot gain entry to a sampling site in order to collect a follow-up tap sample, the system may collect the follow-up tap sample from another sampling site in its sampling pool as long as the new site meets the same targeting criteria, and is within reasonable proximity of the original site.

(v) A non-transient non-community water system, or a community water system that meets the criteria for R309-210-6(7)(b)(vii), that does not have enough taps that can supply first draw samples, as defined in R309-110, may apply to the Director in writing to substitute non-first-draw samples. Such systems must collect as many first draw samples from appropriate taps as possible and identify sampling times and locations that would likely result in the longest standing time for the remaining sites. The Director herein waives the requirement for prior Director approval of non-first draw samples sites selected by the system.

(c) Number of samples

Water systems shall collect at least one sample during each monitoring period specified in R309-210-6(3)(d) from the number of sites listed in the first column (standard monitoring) in Table 210-3. A system conducting reduced monitoring under R309-210-6(3)(d)(iv) may collect one sample from the number of sites specified in the second column (reduced monitoring) in Table 210-3 during each monitoring period specified in R309-210-6(3)(d)(iv). Such reduced monitoring sites shall be representative of the sites required for standard monitoring. A public water system that has fewer than five drinking water taps, that can be used for human consumption meeting the sample site criteria of R309-210-6(6)(a) to reach the required number of sample sites listed in paragraph (c) of this section, must collect at

least one sample from each tap and then must collect additional samples from those taps on different days during the monitoring period to meet the required number of sites. Alternatively the Director may allow these public water systems to collect a number of samples less than the number of sites specified in paragraph (c) of this section, provided that 100 percent of all taps that can be used for human consumption are sampled. The Director must approve this reduction of the minimum number of samples in writing based on a request from the system or onsite verification by the Director. The Director may specify sampling locations when a system is conducting reduced monitoring to ensure that fewer number of sampling sites are representative of the risk to public health as outlined in R309-210-6(3)(a).

TABLE 210-3
NUMBER OF LEAD AND COPPER SAMPLING SITES

System Size (# People Served)	# of sites (Standard Monitoring)	# of sites (Reduced Monitoring)
Greater than 100,000	100	50
10,001-100,000	60	30
3,301 to 10,000	40	20
501 to 3,300	20	10
101 to 500	10	5
100 or less	5	5

(d) Timing of monitoring

(i) Initial tap sampling

The first six-month monitoring period for small, medium-size and large systems shall begin on the following dates in Table 210-4:

TABLE 210-4
INITIAL LEAD AND COPPER MONITORING PERIODS

System Size (# People Served)	First six month Monitoring Period Begins On
Greater than 50,000	January 1, 1992
3,301 to 50,000	July 1, 1992
3,300 or less	July 1, 1993

(A) All large systems shall monitor during two consecutive six-month periods.

(B) All small and medium-size systems shall monitor during each six-month monitoring period until:

(I) the system exceeds the lead or copper action level and is therefore required to implement the corrosion control

treatment requirements under R309-210-6(2), in which case the system shall continue monitoring in accordance with R309-210-6(3)(d)(ii), or

(II) the system meets the lead and copper action levels during two consecutive six-month monitoring periods, in which case the system may reduce monitoring in accordance with R309-210-6(3)(d)(iv).

(ii) Monitoring after installation of corrosion control and source water treatment

(A) Any large system which installs optimal corrosion control treatment pursuant to R309-210-6(2)(d)(iv) shall monitor during two consecutive six-month monitoring periods by the date specified in R309-210-6(2)(d)(v).

(B) Any small or medium-size system which installs optimal corrosion control treatment pursuant to R309-210-6(2)(e)(v) shall monitor during two consecutive six-month monitoring periods by the date specified in R309-210-6(2)(e)(vi).

(C) Any system which installs source water treatment pursuant to R309-210-6(4)(b)(i)(C) shall monitor during two consecutive six-month monitoring periods by the date specified in R309-210-6(4)(b)(i)(D).

(iii) Monitoring after Director specifies water quality parameter values for optimal corrosion control

After the Director specifies the values for water quality control parameters under R309-210-6(4)(a)(vi), the system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the Director specifies the optimal values under R309-210-6(4)(a)(vi).

(iv) Reduced monitoring

(A) A small or medium-size water system that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the number of samples in accordance with R309-210-6(3)(c), Table 210-3, and reduce the frequency of sampling to once per year. A small or medium water system collecting fewer than five samples as specified in paragraph (c) of this section, that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the

frequency of sampling to once per year. In no case can the system reduce the number of samples required below the minimum of one sample per available tap. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

(B) Any water system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Director under R309-210-6(4)(a)(vi) during each of two consecutive six-month monitoring periods may reduce the frequency of monitoring to once per year and reduce the number of lead and copper samples in accordance with paragraph (c) of this section if it receives written approval from the Director. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period. The Director shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with R309-210-6(8), and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring pursuant to this paragraph. The Director shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

(C) A small or medium-size water system that meets the lead and copper action levels during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years. Any water system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Director under R309-210-6(4)(f) during three consecutive years of monitoring may reduce the frequency of monitoring from annually to once every three years if it receives written approval from the Director. Samples collected once every three years shall be collected no later than every third calendar year. The Director shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with R309-210-6(8), and shall notify the system in writing when it determines the system is eligible to reduce the frequency of monitoring to once every three years. The Director shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

(D) A water system that reduces the number and frequency of sampling shall collect these samples from representative sites included in the pool of targeted sampling sites identified in R309-210-6(3)(a). Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August or September unless the Director has approved a different sampling period in accordance with paragraph (d)(iv)(D)(I) of this section.

(I) The Director, at its discretion, may approve a different period for conducting the lead and copper tap sampling for systems collecting a reduced number of samples. Such a period shall be no longer than four consecutive months and must represent a time of normal operation where the highest levels of lead are most likely to occur. For a non-transient non-community water system that does not operate during the months of June through September, and for which the period of normal operation where the highest levels of lead are most likely to occur is not known, the Director shall designate a period that represents a time of normal operation for the system. This sampling shall begin during the period approved or designated by the State in the calendar year immediately following the end of the second consecutive six-month monitoring period for systems initiating annual monitoring and during the three-year period following the end of the third consecutive calendar year of annual monitoring for systems initiating triennial monitoring.

(II) Systems monitoring annually, that have been collecting samples during the months of June through September and that receive Director approval to alter their sample collection period under paragraph (d)(iv)(D)(I) of this section, must collect their next round of samples during a time period that ends no later than 21 months after the previous round of sampling. Systems monitoring triennially that have been collecting samples during the months of June through September, and receive Director approval to alter the sampling collection period as per (d)(iv)(D)(I) of this section, must collect their next round of samples during a time period that ends no later than 45 months after the previous round of sampling. Subsequent rounds of sampling must be collected annually or triennially, as required by this section. Small systems with waivers, granted pursuant to paragraph (g) of this section, that have been collecting samples during the months of June through September and receive Director approval to alter their sample collection period under

paragraph (d)(iv)(D)(I) of this section must collect their next round of samples before the end of the 9 year period.

(E) Any water system that demonstrates for two consecutive 6 month monitoring periods that the tap water lead level computed under R309-200-5(2)(c) is less than or equal to 0.005 mg/L and the tap water copper level computed under R309-200-5(2)(c) is less than or equal to 0.65 mg/L may reduce the number of samples in accordance paragraph (c) of this section and reduce the frequency of sampling to once every three calendar years.

(F) (I) A small or medium-size water system subject to reduced monitoring that exceeds the lead or copper action level shall resume sampling in accordance R309-210-6(3)(d)(iii) and collect the number of samples specified for standard monitoring under R309-210-6(3)(c), Table 210-3. Such system shall also conduct water quality parameter monitoring in accordance with R309-210-6(5)(b), (c) or (d) (as appropriate) during the monitoring period in which it exceeded the action level. Any such system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in paragraph (c) of this section after it has completed two subsequent consecutive six month rounds of monitoring that meet the criteria of paragraph (d)(iv)(A) of this section or may resume triennial monitoring for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(vi)(C) or (d)(iv)(D) of this section.

(II) Any water system subject to the reduced monitoring frequency that fails to meet the lead action level during any four-month monitoring period or that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the Director under R309-210-6(4)(a)(vi) for more than nine days in any six-month period specified in R309-210-6(5)(d) shall conduct tap water sampling for lead and copper at the frequency specified in paragraph (d)(iii) of this section, collect the number of samples specified for standard monitoring under paragraph (c) of this section, and shall resume monitoring for water quality parameters within the distribution system in accordance with R309-210-6(5)(d). This standard tap water sampling shall begin no later than the six-month period beginning January 1 of the calendar year following the lead action level exceedance or water quality parameter excursion.

Such a system may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

(aa) The system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in paragraph (c) of this section after it has completed two subsequent six month rounds of monitoring that meet the criteria of paragraph (d)(iv)(B) of this section and the system has received written approval from the Director that it is appropriate to resume reduced monitoring on an annual frequency. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

(bb) The system may resume triennial monitoring for lead and copper at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(iv)(C) or (d)(iv)(E) of this section and the system has received written approval from the Director that it is appropriate to resume triennial monitoring.

(cc) The system may reduce the number of water quality parameter tap water samples required in accordance with R309-210-6(5)(e)(i) and the frequency with which it collects such samples in accordance with R309-210-6(5)(e)(ii). Such a system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of R309-210-6(5)(e)(ii), that it has requalified for triennial monitoring.

(G) Any water system subject to a reduced monitoring frequency under paragraph (d)(iv) of this section shall notify the Director in writing in accordance with R309-210-6(8)(a)(iii) of any upcoming long-term change in treatment or addition of a new source as described in that section. The Director must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The Director may require the system to resume sampling in accordance with paragraph (d)(iii) of this section and collect the number of samples specified for standard monitoring under paragraph (c) of this section or take other

appropriate steps such as increased water quality parameter monitoring or re-evaluation of its corrosion control treatment given the potentially different water quality considerations.

(e) Additional monitoring by systems

The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the Director in making any determinations (i.e., calculating the 90th percentile lead or copper level).

(f) Invalidation of lead or copper tap water samples. A sample invalidated under this paragraph does not count toward determining lead or copper 90th percentile levels under Sec. 141.80 (c) (3) or toward meeting the minimum monitoring requirements of paragraph (c) of this section.

(i) The Director may invalidate a lead or copper tap water sample at least if one of the following conditions is met.

(A) The laboratory establishes that improper sample analysis caused erroneous results.

(B) The Director determines that the sample was taken from a site that did not meet the site selection criteria of this section.

(C) The sample container was damaged in transit.

(D) There is substantial reason to believe that the sample was subject to tampering.

(ii) The system must report the results of all samples to the Director and all supporting documentation for samples the system believes should be invalidated.

(iii) To invalidate a sample under paragraph (f)(i) of this section, the decision and the rationale for the decision must be documented in writing. The Director may not invalidate a sample solely on the grounds that a follow-up sample result is higher or lower than that of the original sample.

(iv) The water system must collect replacement samples for any samples invalidated under this section if, after the invalidation of one or more samples, the system has too few samples to meet the minimum requirements of paragraph (c) of this section. Any such replacement samples must be taken as soon as possible, but no later than 20 days after the date the Director invalidates the sample or by the end of the applicable monitoring period, whichever occurs later. Replacement samples taken after the end of the applicable monitoring period shall not also be used to meet the monitoring

requirements of a subsequent monitoring period. The replacement samples shall be taken at the same locations as the invalidated samples or, if that is not possible, at locations other than those already used for sampling during the monitoring period.

(g) Monitoring waivers for small systems. Any small system that meets the criteria of this paragraph may apply to the Director to reduce the frequency of monitoring for lead and copper under this section to once every nine years (i.e., a full waiver) if it meets all of the materials criteria specified in paragraph (g)(i) of this section and all of the monitoring criteria specified in paragraph (g) (ii) of this section. Any small system that meets the criteria in paragraphs (g) (i) and (ii) of this section only for lead, or only for copper, may apply to the Director for a waiver to reduce the frequency of tap water monitoring to once ever nine years for that contaminant only (i.e., a partial waiver).

(i) Materials criteria. The system must demonstrate that its distribution system and service lines and all drinking water supply plumbing, including plumbing conveying drinking water within all residences and buildings connected to the system, are free of lead-containing materials and/or copper-containing materials, as those terms are defined in this paragraph, as follows:

(A) Lead. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for lead (i.e., a lead waiver), the water system must provide certification and supporting documentation to the Director that the system is free of all lead-containing materials, as follows:

(I) It contains no plastic pipes which contain lead plasticizers, or plastic service lines which contain lead plasticizers; and

(II) It is free of lead service lines, lead pipes, lead soldered pipe joints, and leaded brass or bronze alloy fittings and fixtures, unless such fittings and fixtures meet the specifications of any standard established pursuant to 42 U.S.C. 300g-6(e) (SDWA section 1417 (e)).

(B) Copper. To qualify for a full waiver, or waiver of the tap water monitoring requirements for copper (i.e., a copper waiver), the water system must provide certification and supporting documentation to the Director that the system contains no copper pipes or copper service lines.

(ii) Monitoring criteria for waiver issuance. The system must have completed at least one 6-month round of standard tap water monitoring for lead and copper at sites approved by the Director and from the number of sites required by paragraph (c) of this section and demonstrate that the 90th

percentile levels for any and all rounds of monitoring conducted since the system became free of all lead-containing and/or copper-containing materials, as appropriate, meet the following criteria.

(A) Lead levels. To qualify for a full waiver, or a lead waiver, the system must demonstrate that the 90th percentile lead level does not exceed 0.005 mg/L.

(B) Copper levels. To qualify for a full waiver, or a copper waiver, the system must demonstrate that the 90th percentile lead level does not exceed 0.65 mg/L.

(iii) Director approval of waiver application. The Director shall notify the system of its waiver determination, in writing, setting forth the basis of its decision and any condition of the waiver. As a condition of the waiver, the Director may require the system to perform specific activities (e.g., limited monitoring, periodic outreach to customers to remind them to avoid installation of materials that might void the waiver) to avoid the risk of lead or copper concentration of concern in tap water. The small system must continue monitoring for lead and copper at the tap as required by paragraphs (d) (i) through (d) (iv) of this section, as appropriate, until it receives written notification from the Director the waiver has been approved.

(iv) Monitoring frequency for systems with waivers.

(A) A system with a full waiver must conduct tap water monitoring for lead and copper in accordance with paragraph (d)(iv)(D) of this section at the reduced number of sampling sites identified in paragraph (c) of this section at least once every nine years and provide the materials certification specified in paragraph (g)(i) of this section for both lead and copper to the Director along with the monitoring results. Samples collected every nine years shall be collected no later than every ninth calendar year.

(B) A system with a partial waiver must conduct tap water monitoring for the waived contaminant in accordance with paragraph (d)(iv)(D) of this section at the reduced number of sampling sites specified in paragraph (c) of this section at least once every nine years and provide the materials certification specified in paragraph (g)(i) of this section pertaining to the waived contaminant along with the monitoring results. Such a system also must continue to monitor for the non-waived contaminant in accordance with requirements of paragraph (d)(i) through (d)(iv) of this section, as appropriate.

(C) Any water system with a full or partial waiver shall notify the Director in writing in accordance with R309-210-6(8)(a)(iii) of any

upcoming long-term change in treatment or addition of a new source, as described in that section. The Director must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The Director has the authority to require the system to add or modify waiver conditions (e.g., require recertification that the system is free of lead-containing and/or copper-containing materials, require additional round(s) of monitoring), if it deems such modifications are necessary to address treatment or source water changes at the system.

(D) If a system with a full or partial waiver because aware that it is no longer free of lead-containing or copper-containing materials, as appropriate, (e.g., as a result of new construction or repairs), the system shall notify the Director in writing no later than 60 days after becoming aware of such a change.

(v) Continued eligibility. If the system continues to satisfy the requirements of paragraph (g) (iv) of this section, the waiver will be renewed automatically, unless any of the conditions listed in paragraph (g)(v)(A) through (g)(v)(C) of this section occurs. A system whose waiver has been revoked may re-apply for a waiver at such time as it again meets the appropriate materials and monitoring criteria of paragraphs (g)(i) and (g)(ii) of this section.

(A) A system with a full waiver or lead waiver no longer satisfies the materials criteria of paragraph (g)(i)(A) of this section or has a 90th percentile lead level greater than 0.005 mg/L.

(B) A system with a full waiver or a copper waiver no longer satisfies the materials criteria of paragraph (g)(i)(B) of this section or has a 90th percentile copper level greater than 0.65 mg/L.

(C) The Director notifies the system, in writing, that the waiver has been revoked, setting forth the basis of its decision.

(vi) Requirements following waiver revocation. A system whose full or partial waiver has been revoked by the Director is subject to the corrosion control treatment and lead and copper tap water monitoring requirements, as follows:

(A) If the system exceeds the lead and/or copper action level, the system must implement corrosion control treatment in accordance with the deadlines specified in R309-210-6(2)(e), and any other applicable requirements of this subpart.

(B) If the system meets both the lead and the copper action level, the system must monitor for lead and copper at the tap no less frequently than once every three years using the reduced number of sample sites specified in paragraph (c) of this section.

(vii) Pre-existing waivers. Small system waivers approved by the Director in writing prior to April 11, 2000 shall remain in effect under the following conditions:

(A) If the system has demonstrated that it is both free of lead-containing and copper- containing materials, as required by paragraph (g)(i) of this section and that its 90th percentile lead levels and 90th percentile copper levels meet the criteria of paragraph (g)(ii) of this section, the waiver remains in effect so long as the system continues to meet the waiver eligibility criteria of paragraph (g)(v) of this section. The first round of tap water monitoring conducted pursuant to paragraph (g)(iv) of this section shall be completed no later than nine years after the last time the system has monitored for lead and copper at the tap.

(B) If the system has met the materials criteria of paragraph (g)(i) of this section but has not met the monitoring criteria of paragraph (g)(ii) of this section, the system shall conduct a round of monitoring for lead and copper at the tap demonstrating that it meets the criteria of paragraph (g)(ii) of this section no later than September 30, 2000. Thereafter, the waiver shall remain in effect as long as the system meets the continued eligibility criteria of paragraph (g)(v) of this section. The first round of tap water monitoring conducted pursuant to paragraph (g)(iv) of this section shall be completed no later than nine years after the round of monitoring conducted pursuant to paragraph (g)(ii) of this section.

(4) Corrosion Control for Control of Lead and Copper

(a) Description of corrosion control treatment requirements.

Each system shall complete the corrosion control treatment requirements described below which are applicable to such system under R309-210-6(2).

(i) System recommendation regarding corrosion control treatment

Based upon the results of lead and copper tap monitoring and water quality parameter monitoring, small and medium-size water systems exceeding the lead or copper action level shall recommend installation of one or more of the corrosion control treatments listed in R309-210-6(4)(a)(iii)(A) which the

system believes constitutes optimal corrosion control for that system. The Director may require the system to conduct additional water quality parameter monitoring in accordance with R309-210-6(5)(b) to assist the Director in reviewing the system's recommendation.

(ii) Studies of corrosion control treatment required for small and medium-size systems.

The Director may require any small or medium-size system that exceeds the lead or copper action level to perform corrosion control studies under R309-210-6(4)(a)(iii) to identify optimal corrosion control treatment for the system.

(iii) Performance of corrosion control studies

(A) Any public water system performing corrosion control studies shall evaluate the effectiveness of each of the following treatments, and, if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for that system:

(I) alkalinity and pH adjustment;

(II) calcium hardness adjustment; and

(III) the addition of a phosphate or silicate based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples.

(B) The water system shall evaluate each of the corrosion control treatments using either pipe rig/loop tests, metal coupon tests, partial-system tests, or analyses based on documented analogous treatments with other systems of similar size, water chemistry and distribution system configuration.

(C) The water system shall measure the following water quality parameters in any tests conducted under this paragraph before and after evaluating the corrosion control treatments listed above:

(I) lead;

(II) copper;

(III) pH;

(IV) alkalinity;

(V) calcium;

(VI) conductivity;

(VII) orthophosphate (when an inhibitor containing a phosphate compound is used);

(VIII) silicate (when an inhibitor containing a silicate compound is used);

(IX) water temperature.

(D) The water system shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and document such constraints with at least one of the following:

(I) data and documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another water system with comparable water quality characteristics; and/or

(II) data and documentation demonstrating that the water system has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes.

(E) The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes.

(F) On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the Director in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in R309-210-6(4)(a)(iii)(A) through R309-210-6(4)(a)(iii)(E).

(iv) Designation of optimal corrosion control treatment

(A) Based upon consideration of available information including, where applicable, studies performed under R309-210-6(4)(a)(iii) and a system's recommended treatment alternative, the Director shall either approve the corrosion control treatment option recommended

by the system, or designate alternative corrosion control treatment(s) from among those listed in R309-210-6(4)(a)(iii)(A). When designating optimal treatment the Director shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes.

(B) The Director shall notify the system of its decision on optimal corrosion control treatment in writing and explain the basis for this determination. If the Director requests additional information to aid its review, the water system shall provide the information.

(v) Installation of optimal corrosion control

Each system shall properly install and operate throughout its distribution system the optimal corrosion control treatment designated by the Director under R309-210-6(4)(a)(iv).

(vi) Review of treatment and specification of optimal water quality control parameters

The Director shall evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the water system and determine whether the system has properly installed and operated the optimal corrosion control treatment designated by the Director in R309-210-6(4)(a)(iv). Upon reviewing the results of tap water and water quality parameter monitoring by the system, both before and after the system installs optimal corrosion control treatment, the Director shall designate:

(A) A minimum value or a range of values for pH measured at each entry point to the distribution system;

(B) A minimum pH value, measured in all tap samples. Such value shall be equal to or greater than 7.0, unless the Director determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control;

(C) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, that the Director determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system;

(D) If alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples;

(E) If calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples.

The values for the applicable water quality control parameters listed above shall be those that the Director determines to reflect optimal corrosion control treatment for the system. The Director may designate values for additional water quality control parameters determined by the Director to reflect optimal corrosion control for the system. The Director shall notify the system in writing of these determinations and explain the basis for the decisions.

(vii) Continued operation and monitoring. All systems optimizing corrosion control shall continue to operate and maintain optimal corrosion control treatment, including maintaining water quality parameters at or above minimum values or within ranges designated by the Director under paragraph (vi) of this section, in accordance with this paragraph for all samples collected under R309-210-6(5)(d) through (f). Compliance with the requirements of this paragraph shall be determined every six months, as specified under R309-210-6(5)(d). A water system is out of compliance with the requirements of this paragraph for a six-month period of it has excursions for any Director specified parameter on more than nine days during the period. An excursion occurs whenever the daily value for one or more of the water quality parameters measured at a sampling location is below the minimum value or outside the range designated by the Director. Daily values are calculated as follows. The Director has discretion to delete results of obvious sampling errors from this calculation.

(A) On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the average of all results collected during the day regardless of whether they are collected through continuous monitoring, grab sampling, or combination of both.

(B) On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the result of that measurement.

(C) On days when no measurement is collected for the water quality parameter at the sampling location, the daily value shall be the daily value calculated on the most recent day on which the water quality parameter was measured at the sample site.

(viii) Modification of treatment decisions

Upon its own initiative or in response to a request by a water system or other interested party, the Director may modify its determination of the optimal corrosion control treatment under R309-210-6(4)(a)(iv) or optimal water quality control parameters under R309-210-6(4)(a)(vi). A request for modification by a system or other interested party shall: be in writing, explain why the modification is appropriate, and provide supporting documentation. The Director may modify its determination where it concludes that such change is necessary to ensure that the system continues to optimize corrosion control treatment. A revised determination shall: be made in writing, set forth the new treatment requirements, explain the basis for the Director's decision, and provide an implementation schedule for completing the treatment modifications.

(b) Source water treatment requirements.

Systems shall complete the applicable source water monitoring and treatment requirements (described in the referenced portions of R309-210-6(4)(b)(ii), and in R309-210-6(3), and R309-210-6(6)) by the following deadlines.

(i) Deadlines for Completing Source Water Treatment Steps

(A) Step 1: A system exceeding the lead or copper action level shall complete lead and copper source water monitoring (R309-210-6(6)(b)) and make a treatment recommendation to the Director (R309-210-6(4)(b)(i)) no later than 180 days after the end of the monitoring period during which the lead or copper action level was exceeded.

(B) Step 2: The Director shall make a determination regarding source water treatment (R309-210-6(4)(b)(ii)(B)) within 6 months after submission of monitoring results under step 1.

(C) Step 3: If the Director requires installation of source water treatment, the system shall install the treatment (R309-210-6(4)(b)(ii)(C)) within 24 months after completion of step 2.

(D) Step 4: The system shall complete follow-up tap water monitoring (R309-210-6(3)(d)(ii)) and source water monitoring (R309-210-6(6)(c)) within 36 months after completion of step 2.

(E) Step 5: The Director shall review the system's installation and operation of source water treatment and specify maximum permissible source water levels (R309-210-6(4)(b)(ii)(D)) within 6 months after completion of step 4.

(F) Step 6: The system shall operate in compliance with the Director specified maximum permissible lead and copper source water levels (R309-210-6(4)(b)(ii)(D)) and continue source water monitoring (R309-210-6(6)(d)).

(ii) Description of Source Water Treatment Requirements

(A) System treatment recommendation

Any system which exceeds the lead or copper action level shall recommend in writing to the Director the installation and operation of one of the source water treatments listed in R309-210-6(4)(b)(ii)(B). A system may recommend that no treatment be installed based upon a demonstration that source water treatment is not necessary to minimize lead and copper levels at users' taps.

(B) Determination regarding source water treatment

The Director shall complete an evaluation of the results of all source water samples submitted by the water system to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to users' taps. If the Director determines that treatment is needed, the Director shall either require installation and operation of the source water treatment recommended by the system (if any) or require the installation and operation of another source water treatment from among the following: ion exchange, reverse osmosis, lime softening or coagulation/filtration. If the Director requests additional information to aid in its review, the water system shall provide the information by the date specified by the Director in its request. The Director shall notify the system in writing of the determination and set forth the basis for the decision.

(C) Installation of source water treatment

Each system shall properly install and operate the source water treatment designated by the Director under R309-210-6(4)(b)(ii)(B).

(D) Review of source water treatment and specification of maximum permissible source water levels

The Director shall review the source water samples taken by the water system both before and after the system installs source water treatment, and determine whether the system has properly installed and operated the source water treatment designated by the Director. Based upon its review, the Director shall designate the maximum permissible lead and copper concentrations for finished water

entering the distribution system. Such levels shall reflect the contaminant removal capability of the treatment properly operated and maintained. The Director shall notify the system in writing and explain the basis for the decision.

(E) Continued operation and maintenance

Each water system shall maintain lead and copper levels below the maximum permissible concentrations designated by the Director at each sampling point monitored in accordance with R309-210-6(6). The system is out of compliance with this paragraph if the level of lead or copper at any sampling point is greater than the maximum permissible concentration designated by the Director.

(F) Modification of treatment decisions

Upon its own initiative or in response to a request by a water system or other interested party, the Director may modify its determination of the source water treatment under R309-210-6(4)(b)(ii)(B), or maximum permissible lead and copper concentrations for finished water entering the distribution system under R309-210-6(4)(b)(ii)(D). A request for modification by a system or other interested party shall: be in writing, explain why the modification is appropriate, and provide supporting documentation. The Director may modify the determination where it concludes that such change is necessary to ensure that the system continues to minimize lead and copper concentrations in source water. A revised determination shall: be made in writing, set forth the new treatment requirements, explain the basis for the decision, and provide an implementation schedule for completing the treatment modifications.

(c) Lead service line replacement requirements.

(i) (A) Systems that fail to meet the lead action level in tap samples taken pursuant to R309-210-6(3)(d)(ii), after installing corrosion control and/or source water treatment (whichever sampling occurs later), shall replace lead service lines in accordance with the requirements of this section. If a system is in violation of R309-210-6(2) or R309-210-6(4)(b) for failure to install source water or corrosion control treatment, the Director may require the system to commence lead service line replacement under this section after the date by which the system was required to conduct monitoring under R309-104-4.2.3.d.2. has passed. The first year of lead service line replacement shall begin on the first day following the end of the monitoring period in which the action level was exceeded under paragraph (a) of this section. If monitoring is required annually or

less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs. If the Director has established an alternate monitoring period, then the end of the monitoring period will be the last day of that period.

(B) Any water system resuming a lead service line replacement program after the cessation of its lead service line replacement program as allowed by paragraph (f) of this section shall update its inventory of lead service lines to include those sites that were previously determined not to require replacement through the sampling provision under paragraph (c) of this section. The system will then divide the updated number of remaining lead service lines by the number of remaining years in the program to determine the number of lines that must be replaced per year (7 percent lead service line replacement is based on a 15-year replacement program, so, for example, systems resuming lead service line replacement after previously conducting two years of replacement would divide the updated inventory by 13). For those systems that have completed a 15-year lead service line replacement program, the Director will determine a schedule for replacing or retesting lines that were previously tested out under the replacement program when the system re-exceeds the action level.

(ii) A system shall replace annually at least 7 percent of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins. The system shall identify the initial number of lead service lines in its distribution system, including an identification of the portion(s) owned by the system, based upon a materials evaluation, including the evaluation required under R309-210-6(3)(a) and relevant legal authorities (e.g., contracts, local ordinances) regarding the portion owned by the system. The first year of lead service line replacement shall begin on the date the action level was exceeded in tap sampling referenced in R309-210-6(4)(c)(i).

(iii) A system is not required to replace an individual lead service line if the lead concentration in all service line samples from that line, taken pursuant to R309-210-6(3)(b)(iii), is less than or equal to 0.015 mg/L.

(iv) A water system shall replace that portion of the lead service line that it owns. In cases where the system does not own the entire lead service line, the system shall notify the owner of the line, or the owner's authorized agent, that the system will replace the portion of the service line that it owns and shall offer to replace the owner's portion of the line. A system is not required to bear the cost of replacing the privately-owned portion of the line, nor is it required to replace the privately-owned portion where the owner chooses not to pay the cost of replacing the privately owned portion of the line, or where

replacing the privately-owned portion would be precluded by State, local or common law. A water system that does not replace the entire length of the service line also shall complete the following tasks.

(A) At least 45 days prior to commencing with the partial replacement of a lead service line, the water system shall provide notice to the resident(s) of all buildings served by the line explaining that they may experience a temporary increase of lead levels in their drinking water, along with guidance on measures consumers can take to minimize their exposure to lead. The Director may allow the water system to provide notice under the previous sentence less than 45 days prior to commencing partial lead service line replacement where such replacement is in conjunction with emergency repairs. In addition, the water system shall inform the resident(s) served by the line that the system will, at the system's expense, collect a sample from each partially-replaced lead service line that is representative of the water in the service line for analysis of lead content, as prescribed under R309-210-6(3)(b)(iii), within 72 hours after the completion of the partial replacement of the service line. The system shall collect the sample and report the results of the analysis to the owner and the resident(s) served by the line within three business days of receiving the results. Mailed notices post-marked within three business days of receiving the results shall be considered on time.

(B) The water system shall provide the information required by paragraph (c)(iv)(A) of this section to the residents of individual dwellings by mail or by other methods approved by the Director. In instances where multi-family dwellings are served by the line, the water system shall have the option to post the information at a conspicuous location.

(v) The Director shall require a system to replace lead service lines on a shorter schedule than that required by this section, taking into account the number of lead service lines in the system, where such a shorter replacement schedule is feasible. The Director shall make this determination in writing and notify the system of its finding within 6 months after the system is triggered into lead service line replacement based on monitoring referenced in R309-210-6(4)(c)(i).

(vi) Any system may cease replacing lead service lines whenever first draw samples collected pursuant to R309-210-6(3)(b)(ii) meet the lead action level during each of two consecutive monitoring periods and the system submits the results to the Director. If first draw tap samples collected in any such water system thereafter exceeds the lead action level, the system shall recommence replacing lead service lines, pursuant to R309-210-6(4)(c)(ii)(B).

(vii) To demonstrate compliance with R309-210-6(4)(c)(i) through R309-210-6(4)(c)(iv), a system shall report to the Director the information specified in R309-210-6(8)(e).

(5) Monitoring requirements for water quality parameters.

All large water systems and all small and medium-size systems that exceed the lead or copper action level shall monitor water quality parameters in addition to lead and copper in accordance with this section.

(a) General Requirements

(i) Sample collection methods

(A) Tap samples shall be representative of water quality throughout the distribution system taking into account the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Tap sampling under this section is not required to be conducted at taps targeted for lead and copper sampling under R309-210-6(3)(a).

(B) Samples collected at the entry point(s) to the distribution system shall be from locations representative of each source after treatment. If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

(ii) Number of samples

(A) Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under R309-210-6(5)(b) through R309-210-6(5)(e) from the following number of sites in Table 210-5.

TABLE 210-5
NUMBER OF WATER QUALITY PARAMETER SAMPLE SITES

System Size (# of People Served)	# of Sites For Water Quality Parameters
Greater than 100,000	25
10,001-100,000	10
3,301 to 10,000	3

501 to 3,300	2
101 to 500	1
100 or less	1

(B) Except as provided in paragraph (c)(iii) of this section, Systems shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in R309-210-6(5)(b). Systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in R309-210-6(5)(c) through R309-210-6(5)(e).

(b) Initial Sampling

All large water systems shall measure the applicable water quality parameters as specified below at taps and at each entry point to the distribution system during each six-month monitoring period specified in R309-210-6(3)(d)(i). All small and medium-size systems shall measure the applicable water quality parameters at the locations specified below during each six-month monitoring period specified in R309-210-6(3)(d)(i) during which the system exceeds the lead or copper action level.

(i) At taps:

(A) pH;

(B) alkalinity;

(C) orthophosphate, when an inhibitor containing a phosphate compound is used;

(D) silica, when an inhibitor containing a silicate compound is used;

(E) calcium;

(F) conductivity; and

(G) water temperature.

(ii) At each entry point to the distribution system: all of the applicable parameters listed in R309-210-6(5)(b)(i).

(c) Monitoring after installation of corrosion control

Any large system which installs optimal corrosion control treatment pursuant to R309-210-6(2)(d)(iv) shall measure the water quality parameters at the locations and

frequencies specified below during each six-month monitoring period specified in R309-210-6(3)(d)(ii)(A). Any small or medium-size system which installs optimal corrosion control treatment shall conduct such monitoring during each six-month monitoring period specified in R309-210-6(3)(d)(ii)(B) in which the system exceeds the lead or copper action level.

(i) At taps, two samples for:

(A) pH;

(B) alkalinity;

(C) orthophosphate, when an inhibitor containing a phosphate compound is used;

(D) silica, when an inhibitor containing a silicate compound is used;

(E) calcium, when calcium carbonate stabilization is used as part of corrosion control.

(ii) Except as provided in Paragraph (c)(iii) of this section, at each entry point to the distribution system, at least on sample no less frequently than every two weeks (bi-weekly) for:

(A) pH;

(B) when alkalinity is adjusted as part of optimal corrosion control, a reading of the dosage rate of the chemical used to adjust alkalinity, and the alkalinity concentration; and

(C) when a corrosion inhibitor is used as part of optimal corrosion control, a reading of the dosage rate of the inhibitor used, and the concentration of orthophosphate or silica (whichever is applicable).

(iii) Any ground water system can limit entry point sampling described in paragraph (c)(ii) of this section to those entry points that are representative of water quality and treatment conditions throughout the system. If water from untreated ground water sources mixes with water from treated ground water sources, the system must monitor for water quality parameters both at representative entry points receiving treatment and representative entry points receiving no treatment. Prior to the start of any monitoring under this paragraph, the system shall provide to the Director written information identifying the selected entry points and documentation, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

(d) Monitoring after Director specifies water quality parameter values for optimal corrosion control.

After the Director specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment under R309-210-6(4)(a)(vi), all large systems shall measure the applicable water quality parameters in accordance with paragraph (c) of this section and determine compliance with the requirements of R309-210-6(4)(a)(vii) every six months with the first six-month period to begin on either January 1 or July 1, whichever comes first, after the Director specifies the optimal values under R309-210-6(4)(a)(vi). Any small or medium-size system shall conduct such monitoring during each six-month period specified in this paragraph in which the system exceeds the lead or copper action level. For any such small and medium-size system that is subject to a reduced monitoring frequency pursuant to R309-210-6(3)(d)(iv) at the time of the action level exceedance, the start of the applicable six-month monitoring period under this paragraph shall coincide with the start of the applicable monitoring period under R309-210-6(3)(d)(iv). Compliance with Director-designated optimal water quality parameter values shall be determined as specified under R309-210-6(4)(a)(vii).

(e) Reduced monitoring

(i) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Director under R309-210-6(4)(a)(vi) during three consecutive years of monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in this paragraph (e)(i) of this section from every six months to annually. This sampling begins during the calendar year immediately following the end of the monitoring period in which the third consecutive year of six-month monitoring occurs. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Director under R309-210-6(4)(a)(vi), during three consecutive years of annual monitoring under this paragraph may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in paragraph (e)(i) of this section from annually to every three years. This sampling begins no later than the third calendar year following the end of the monitoring period in which the third consecutive year of monitoring occurs.

TABLE 210-6 REDUCED NUMBER OF WATER QUALITY PARAMETER SAMPLE SITES	
System Size (# People Served)	Reduced # of Sites for Water Quality Parameters
Greater than 100,000	10

10,001 to 100,000	7
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
100 or less	1

(ii) (A) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under R309-210-6(4)(a)(vi) during three consecutive years of monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in this paragraph (e)(i) of this section from every six months to annually. This sampling begins during the calendar year immediately following the end of the monitoring period in which the third consecutive year of six-month monitoring occurs. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under R309-210-6(4)(a)(vi), during three consecutive years of annual monitoring under this paragraph may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in paragraph (e)(i) of this section from annually to every three years. This sampling begins no later than the third calendar year following the end of the monitoring period in which the third consecutive year of monitoring occurs.

(B) A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters specified in paragraph (e)(i) of this section to every three years if it demonstrates during two consecutive monitoring periods that its tap water lead level at the 90th percentile is less than or equal to the PQL for lead specified in R309-200-4(3), that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L for copper in R309-200-5(2)(c), and that it also has maintained the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Director under R309-210-6(4)(a)(vi). Monitoring conducted every three years shall be done no later than every third calendar year.

(iii) A water system that conducts sampling annually shall collect these samples evenly throughout the year so as to reflect seasonal variability.

(iv) Any water system subject to the reduced monitoring frequency that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the Director in R309-210-

6(4)(a)(vi) for more than 9 days in any six month period specified in R309-210-6(4)(a)(vii) shall resume distribution system tap water sampling in accordance with the number and frequency requirements in paragraph (d) of this section. Such a system may resume annual monitoring for water quality parameters at the tap at the reduced number of sites specified in paragraph (e)(i) of this section after it has completed two subsequent consecutive six month rounds of monitoring that meet the criteria of that paragraph or may resume triennial monitoring for water quality parameters at the tap at the reduced number os sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (e)(ii)(A) or (e)(ii)(B) of this section.

(f) Additional monitoring by systems

The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the Director in making any determinations (i.e., determining concentrations of water quality parameters) under this section or R309-210-6(4)(a).

(g) The Director has the authority to allow the use of previously collected monitoring data for purposes of monitoring, if the data were collected in accordance with this section and analyzed in accordance with R309-104-8.

(6) Monitoring requirements for lead and copper in source water.

(a) Sample location, collection methods, and number of samples

(i) A water system that fails to meet the lead or copper action level on the basis of tap samples collected in accordance with R309-210-6(3) shall collect lead and copper source water samples in accordance with the following requirements regarding sample location, number of samples, and collection methods:

(A) Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). The system shall take one sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(B) Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point). The system shall take each sample at the same

sampling point unless conditions make another sampling point more representative of each source or treatment plant. For purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.

(C) If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

(D) The Director may reduce the total number of samples which must be analyzed by allowing the use of compositing. Compositing of samples must be done by certified laboratory personnel. Composite samples from a maximum of five samples are allowed, provided that if the lead concentration in the composite sample is greater than or equal to 0.001 mg/L or the copper concentration is greater than or equal to 0.160 mg/L, then either:

(I) A follow up sample shall be taken and analyzed within 14 days at each sampling point included in the composite; or

(II) If duplicates of or sufficient quantities from the original samples from each sampling point used in the composite are available, the system may use these instead of resampling.

(ii) Where the results of sampling indicate an exceedance of maximum permissible source water levels established under R309-210-6(4)(b)(ii)(D), the Director may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point. If a confirmation sample is taken for lead or copper, then the results of the initial and confirmation sample shall be averaged in determining compliance with the specified maximum permissible levels. Any sample value below the detection limit shall be considered to be zero. Any value above the detection limit but below the PQL shall either be considered as the measured value or be considered one-half the PQL.

(b) Monitoring frequency after system exceeds tap water action level.

Any system which exceeds the lead or copper action level at the tap shall collect one source water sample from each entry point to the distribution system no later than six months after the end of the monitoring period during which the lead or copper action level was exceeded. For monitoring periods that are annual or less frequent, the end of the monitoring period is September 30 of the calendar year in which the

sampling occurs, or if the Director has established an alternate monitoring period, the last day of that period.

(c) Monitoring frequency after installation of source water treatment.

Any system which installs source water treatment pursuant to R309-210-6(4)(b)(i)(C) shall collect an additional source water sample from each entry point to the distribution system during two consecutive six-month monitoring periods by the deadline specified in R309-210-6(4)(b)(i)(D).

(d) Monitoring frequency after Director specifies maximum permissible source water levels or determines that source water treatment is not needed

(i) A system shall monitor at the frequency specified below in cases where the Director specifies maximum permissible source water levels under R309-210-6(4)(b)(ii)(D) or determines that the system is not required to install source water treatment under R309-210-6(4)(b)(ii)(B).

(A) A water system using only groundwater shall collect samples once during the three-year compliance period in effect when the applicable determination under R309-210-6(6)(d)(i) is made. Such systems shall collect samples once during each subsequent compliance period. Triennial samples shall be collected every third calendar year.

(B) A water system using surface water (or a combination of surface and ground water) shall collect samples once during each calendar year, the first annual monitoring period to begin during the year in which the applicable Director determination is made under paragraph (d)(i) of this section.

(ii) A system is not required to conduct source water sampling for lead and/or copper if the system meets the action level for the specific contaminant in tap water samples during the entire source water sampling period applicable to the system under R309-210-6(6)(d)(i)(A) or (B).

(e) Reduced monitoring frequency

(i) A water system using only ground water may reduce the monitoring frequency for lead and copper in source water to once during each nine-year compliance cycle (as that term is defined in R309-110-4) provided that the samples are collected no later than every ninth calendar year and if the system meets one of the following criteria:

(A) The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum

permissible lead and copper concentrations specified by the Director in R309-210-6(4)(b)(ii)(D) during at least three consecutive compliance periods under paragraph (d)(i) of this section; or

(B) The Director has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive compliance periods in which sampling was conducted under paragraph (d)(i) of this section, the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

(ii) A water system using surface water (or a combination of surface water and ground water) may reduce the monitoring frequency in paragraph (d)(i) of this section to once during each nine-year compliance cycle (as that term is defined in R309-110-4) provided that the samples are collected no later than every ninth calendar year and if the system meets one of the following criteria:

(A) The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Director in R309-210-6(4)(b)(ii)(D) for at least three consecutive years; or

(B) The Director has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive years, the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

(iii) A water system that uses a new source of water is not eligible for reduced monitoring for lead and/or copper until concentrations in samples collected from the new source during three consecutive monitoring periods are below the maximum permissible lead and copper concentrations specified by the Director in R309-210-6(4)(b)(i)(E).

(iv) The Director has the authority to allow the use of previously collected monitoring data for purposes of monitoring, if the data were collected in accordance with this section and analyzed in accordance with R309-104-8.

(7) Public education and supplemental monitoring requirements.

All water systems must deliver a consumer notice of lead tap water monitoring results to persons served by the water system at sites that are tested, as specified in paragraph (d) of this section. A water system that exceeds the lead action level based on tap water samples

collected in accordance with R309-210-6(3) shall deliver the public education materials contained in paragraph (a) of this section in accordance with the requirements in paragraph (b) of this section. Water systems that exceed the lead action level must sample the tap water of any customer who requests it in accordance with paragraph (c) of this section.

(a) Content of written public education materials.

(i) Community water systems and Non-transient non-community water systems. Water systems must include the following elements in printed materials (e.g., brochures and pamphlets) in the same order as listed below. In addition, paragraphs (a)(i)(A) through (B) and (a)(i)(F) must be included in the materials, exactly as written, except for the text in brackets in these paragraphs for which the water system must include system-specific information. Any additional information presented by a water system must be consistent with the information below and be in plain language that can be understood by the general public. Water systems must submit all written public education materials to the Director prior to delivery. The Director may require the system to obtain approval of the content of written public materials prior to delivery.

(A) IMPORTANT INFORMATION ABOUT LEAD IN YOUR DRINKING WATER. (INSERT NAME OF WATER SYSTEM) found elevated levels of lead in drinking water in some homes/buildings. Lead can cause serious health problems, especially for pregnant women and young children. Please read this information closely to see what you can do to reduce lead in your drinking water.

(B) Health effects of lead. Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.

(C) Sources of Lead.

(I) Explain what lead is.

(II) Explain possible sources of lead in drinking water and how lead enters drinking water. Include information on

home/building plumbing materials and service lines that may contain lead.

(III) Discuss other important sources of lead exposure in addition to drinking water (e.g., paint).

(D) Discuss the steps the consumer can take to reduce their exposure to lead in drinking water.

(I) Encourage running the water to flush out the lead.

(II) Explain concerns with using hot water from the tap and specifically caution against the use of hot water for preparing baby formula.

(III) Explain that boiling water does not reduce lead levels.

(IV) Discuss other options consumers can take to reduce exposure to lead in drinking water, such as alternative sources or treatment of water.

(V) Suggest that parents have their child's blood tested for lead.

(E) Explain why there are elevated levels of lead in the system's drinking water (if known) and what the water system is doing to reduce the lead levels in homes/buildings in this area.

(F) For more information, call us at (INSERT YOUR NUMBER) ((IF APPLICABLE), or visit our Web site at (INSERT YOUR WEB SITE HERE)). For more information on reducing lead exposure around your home/building and the health effects of lead, visit EPA's Web site at "http://frwebgate.access.gpo.gov/cgi-bin/leaving.cgi?from=leavingFR.html&log=linklog&to=http://www.epa.gov/lead" or contact your health care provider.

(ii) Community water systems. In addition to including the elements specified in paragraph (a)(i) of this section, community water systems must:

(A) Tell consumers how to get their water tested.

(B) Discuss lead in plumbing components and the difference between low lead and lead free.

(b) Delivery of public education materials.

(i) For public water systems serving a large proportion of non-English speaking consumers, as determined by the Director, the public education materials must contain information in the appropriate language(s) regarding the importance of the notice or contain a telephone number or address where persons served may contact the water system to obtain a translated copy of the public education materials or to request assistance in the appropriate language.

(ii) A community water system that exceeds the lead action level on the basis of tap water samples collected in accordance with R309-210-6(3), and that is not already conducting public education tasks under this section, must conduct the public education tasks under this section within 60 days after the end of the monitoring period in which the exceedance occurred:

(A) Deliver printed materials meeting the content requirements of paragraph (a) of this section to all bill paying customers.

(B) (I) Contact customers who are most at risk by delivering education materials that meet the content requirements of paragraph (a) of this section to local public health agencies even if they are not located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community water system's users. The water system must contact the local public health agencies directly by phone or in person. The local public health agencies may provide a specific list of additional community based organizations serving target populations, which may include organizations outside the service area of the water system. If such lists are provided, systems must deliver education materials that meet the content requirements of paragraph (a) of this section to all organizations on the provided lists.

(II) Contact customers who are most at risk by delivering materials that meet the content requirements of paragraph (a) of this section to the following organizations listed in aa through ff that are located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community water system's users:

(aa) Public and private schools or school boards.

(bb) Women Infants and Children (WIC) and Head Start programs.

(cc) Public and private hospitals and medical clinics.

(dd) Pediatricians.

(ee) Family planning clinics.

(ff) Local welfare agencies.

(III) Make a good faith effort to locate the following organizations within the service area and deliver materials that meet the content requirements of paragraph (a) of this section to them, along with an informational notice that encourages distribution to all potentially affected customers or users. The good faith effort to contact at-risk customers may include requesting a specific contact list of these organizations from the local public health agencies, even if the agencies are not located within the water system's service area:

(aa) Licensed childcare centers.

(bb) Public and private preschools.

(cc) Obstetricians-Gynecologists and Midwives.

(C) No less often than quarterly, provide information on or in each water bill as long as the system exceeds the action level for lead. The message on the water bill must include the following statement exactly as written except for the text in brackets for which the water system must include system-specific information: (INSERT NAME OF WATER SYSTEM) found high levels of lead in drinking water in some homes. Lead can cause serious health problems. For more information please call (INSERT NAME OF WATER SYSTEM) (or visit (INSERT YOUR WEB SITE HERE)). The message or delivery mechanism can be modified in consultation with the Director; specifically, the Director may allow a separate mailing of public education materials to customers if the water system cannot place the information on water bills.

(D) Post material meeting the content requirements of paragraph (a) of this section on the water system's Web site if the system serves a population greater than 100,000.

(E) Submit a press release to newspaper, television and radio stations.

(F) In addition to paragraphs (b)(ii)(A) through (E) of this section, systems must implement at least three activities from one or more categories listed below. The educational content and selection of these activities must be determined in consultation with the Director.

(I) Public Service Announcements.

(II) Paid advertisements.

(III) Public Area Information Displays.

(IV) Emails to customers.

(V) Public Meetings.

(VI) Household Deliveries.

(VII) Targeted Individual Customer Contact.

(VIII) Direct material distribution to all multi-family homes and institutions.

(VIIII) Other methods approved by the Director.

(G) For systems that are required to conduct monitoring annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or, if the Director has established an alternate monitoring period, the last day of that period.

(iii) As long as a community water system exceeds the action level, it must repeat the activities pursuant to paragraph (b)(ii) of this section as described in paragraphs (b)(iii)(A) through (D) of this section.

(A) A community water system shall repeat the tasks contained in paragraphs (b)(ii)(A), (B) and (F) of this section every 12 months.

(B) A community water system shall repeat tasks contained in paragraph (b)(ii)(C) of this section with each billing cycle.

(C) A community water system serving a population greater than 100,000 shall post and retain material on a publicly accessible Web site pursuant to paragraph (b)(ii)(D) of this section.

(D) The community water system shall repeat the task in paragraph (b)(ii)(E) of this section twice every 12 months on a schedule agreed upon with the Director. The Director can allow activities in

paragraph (b)(ii) of this section to extend beyond the 60-day requirement if needed for implementation purposes on a case-by-case basis; however, this extension must be approved in writing by the Director in advance of the 60-day deadline.

(iv) Within 60 days after the end of the monitoring period in which the exceedance occurred (unless it already is repeating public education tasks pursuant to paragraph (b)(v) of this section), a non-transient non-community water system shall deliver the public education materials specified by paragraph (a) of this section as follows:

(A) Post informational posters on lead in drinking water in a public place or common area in each of the buildings served by the system; and

(B) Distribute informational pamphlets and/or brochures on lead in drinking water to each person served by the non-transient non-community water system. The Director may allow the system to utilize electronic transmission in lieu of or combined with printed materials as long as it achieves at least the same coverage.

(C) For systems that are required to conduct monitoring annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or, if the Director has established an alternate monitoring period, the last day of that period.

(v) A non-transient non-community water system shall repeat the tasks contained in paragraph (b)(iv) of this section at least once during each calendar year in which the system exceeds the lead action level. The Director can allow activities in (b)(iv) of this section to extend beyond the 60-day requirement if needed for implementation purposes on a case-by-case basis; however, this extension must be approved in writing by the Director in advance of the 60-day deadline.

(vi) A water system may discontinue delivery of public education materials if the system has met the lead action level during the most recent six-month monitoring period conducted pursuant to R309-210-6(3). Such a system shall recommence public education in accordance with this section if it subsequently exceeds the lead action level during any monitoring period.

(vii) A community water system may apply to the Director, in writing, (unless the Director has waived the requirement for prior Director approval) to use only the text specified in paragraph (a)(i) of this section in lieu of the text in paragraphs (a)(i) and (a)(ii) of this section and to perform the tasks listed in paragraphs (b)(iv) and (b)(v) of this section in lieu of the tasks in paragraphs (b)(ii) and (b)(iii) of this section if:

(A) The system is a facility, such as a prison or a hospital, where the population served is not capable of or is prevented from making improvements to plumbing or installing point of use treatment devices; and

(B) The system provides water as part of the cost of services provided and does not separately charge for water consumption.

(viii) A community water system serving 3,300 or fewer people may limit certain aspects of their public education programs as follows:

(A) With respect to the requirements of paragraph (b)(ii)(F) of this section, a system serving 3,300 or fewer must implement at least one of the activities listed in that paragraph.

(B) With respect to the requirements of paragraph (b)(ii)(B) of this section, a system serving 3,300 or fewer people may limit the distribution of the public education materials required under that paragraph to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children.

(C) With respect to the requirements of paragraph (b)(ii)(E) of this section, the Director may waive this requirement for systems serving 3,300 or fewer persons as long as system distributes notices to every household served by the system.

(c) Supplemental monitoring and notification of results. A water system that fails to meet the lead action level on the basis of tap samples collected in accordance with R309-210-6(3) shall offer to sample the tap water of any customer who requests it. The system is not required to pay for collecting or analyzing the sample, nor is the system required to collect and analyze the sample itself.

(d) Notification of results.

(i) Reporting requirement. All water systems must provide a notice of the individual tap results from lead tap water monitoring carried out under the requirements of R309-210-6(3) to the persons served by the water system at the specific sampling site from which the sample was taken (e.g., the occupants of the residence where the tap was tested).

(ii) Timing of notification. A water system must provide the consumer notice as soon as practical, but no later than 30 days after the system learns of the tap monitoring results.

(iii) Content. The consumer notice must include the results of lead tap water monitoring for the tap that was tested, an explanation of the health effects of lead, list steps consumers can take to reduce exposure to lead in drinking water and contact information for the water utility. The notice must also provide the maximum contaminant level goal and the action level for lead and the definitions for these two terms from R309-225-5(3).

(iv) Delivery. The consumer notice must be provided to persons served at the tap that was tested, either by mail or by another method approved by the Director. For example, upon approval by the Director, a non-transient non-community water system could post the results on a bulletin board in the facility to allow users to review the information. The system must provide the notice to customers at sample taps tested, including consumers who do not receive water bills.

(8) Reporting requirements.

All water systems shall report all of the following information to the Director in accordance with this section.

(a) Reporting requirements for tap water monitoring for lead and copper and for water quality parameter monitoring

(i) Except as provided in paragraph (a)(i)(H) of this section, a water system shall report the information specified below for all tap water samples specified in R309-210-6(3) and for all water quality parameter samples specified in R309-210-6(5) within the first 10 days following the end of each applicable monitoring period specified in R309-210-6 (3) and (5) (i.e., every six months, annually, every 3 years, or every 9 years). For monitoring periods with a duration less than six months, the end of the monitoring period is the last date samples can be collected during that period as specified in R309-210-6(3) and R309-210-6(5).

(A) the results of all tap samples for lead and copper including the location of each site and the criteria under R309-210-6(3)(a)(iii), (iv), (v), (vi), and (vii) under which the site was selected for the system's sampling pool;

(B) Documentation for each tap water lead or copper sample for which the water system request invalidation pursuant to R309-210-6(3)(f)(ii);

(D) the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period, (calculated in accordance with R309-200-

5(2)(c))unless the Director calculates the system's 90th percentile lead and copper levels under paragraph (h) of this section;

(E) with the exception of initial tap sampling conducted pursuant to R309-210-6(3)(d)(i), the system shall designate any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed;

(F) the results of all tap samples for pH, and where applicable, alkalinity, calcium, conductivity, temperature, and orthophosphate or silica collected under R309-210-6(5)(b) through (e);

(G) the results of all samples collected at the entry point(s) to the distribution system for applicable water quality parameters under R309-210-6(5)(b) through (e).

(H) A water system shall report the results of all water quality parameter samples collected under R309-210-6(5)(c) through (f) during each six month monitoring period specified in R309-210-6(5)(d) within the first 10 days following the end of the monitoring period unless the Director has specified a more frequent reporting requirement.

(ii) For a non-transient non-community water system, or a community water system meeting the criteria of R309-210-6(7)(b)(vii), that does not have enough taps that can provide first draw samples, the system must identify, in writing, each site that did not meet the six hour minimum standing time and the length of standing time for that particular substitute sample collected pursuant to R309-210-6(3)(b)(v) and include this information with the lead and copper tap sample results required to be submitted pursuant to paragraph (a)(i)(A) of this section. The Director has waived prior Director approval of non-first-draw samples sites selected by the system pursuant to R309-210-6(3)(b)(v).

(iii) At a time specified by the Director, or if no specific time is designated by the Director, then as early as possible prior to the addition of a new source or any long-term change in water treatment, a water system deemed to have optimized corrosion control under R309-210-6(2)(b)(iii), a water system subject to reduced monitoring pursuant to R309-210-6(3)(d)(iv), or a water system subject to a monitoring waiver pursuant to R309-210-6(3)(g), shall submit written documentation to the Director describing the change or addition. The Director must review and approve the addition of a new source or long-term change in treatment before it is implemented by the water system. Examples of long-term treatment changes include the addition of a new treatment process or modification of an existing treatment process. Examples of modifications include switching secondary disinfectants,

switching coagulants (e.g., alum to ferric chloride), and switching corrosion inhibitor products (e.g., orthophosphate to blended phosphate). Long-term changes can include dose changes to existing chemicals if the system is planning long-term changes to its finished water pH or residual inhibitor concentration. Long-term treatment changes would not include chemical dose fluctuations associated with daily raw water quality changes.

(iv) Any small system applying for a monitoring waiver under R309-210-6(3)(g), or subject to a waiver granted pursuant to R309-210-6(3)(g)(iii), shall provide the following information to the Director in writing by the specified deadline:

(A) By the start of the first applicable monitoring period in R309-210-6(3), any small system applying for a monitoring waiver shall provide the documentation required to demonstrate that it meets the waiver criteria of R309-210-6(3)(g)(i) and (ii).

(B) No later than nine years after the monitoring previously conducted pursuant to R309-210-6(3)(g)(ii) or (g)(iv)(A), each small system desiring to maintain its monitoring waiver shall provide the information required by R309-210-6(3)(g)(iv)(A) and (B).

(C) No later than 60 days after it becomes aware that it is no longer free of lead-containing or copper containing material, as appropriate, each small system with a monitoring waiver shall provide written notification to the Director, setting forth the circumstances resulting in the lead containing or copper containing materials being introduced into the system and what corrective action, if any, the system plans to remove these materials

(D) By October 10, 2000, any small system with a waiver granted prior to April 11, 2000 and that has not previously met the requirements of R309-210-6(3)(g)(ii) shall provide the information required by that paragraph.

(v) Each ground water system that limits water quality parameter monitoring to a subset of entry points under R309-210-6(5)(c)(iii) shall provide, by the commencement of such monitoring, written correspondence to the Director that identifies the selected entry points and includes information sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

(b) Source water monitoring reporting requirements

(i) A water system shall report the sampling results for all source water samples collected in accordance with R309-210-6(6) within the first 10 days

following the end of each source water monitoring period (i.e., annually, per compliance period, per compliance cycle) specified in R309-210-6(6).

(ii) With the exception of the first round of source water sampling conducted pursuant to R309-210-6(6)(b), the system shall specify any site which was not sampled during previous monitoring periods, and include an explanation of why the sampling point has changed.

(c) Corrosion control treatment reporting requirements

By the applicable dates under R309-210-6(2), systems shall report the following information:

(i) for systems demonstrating that they have already optimized corrosion control, information required in R309-210-6(2)(b)(ii) or R309-210-6(2)(b)(iii).

(ii) for systems required to optimize corrosion control, their recommendation regarding optimal corrosion control treatment under R309-210-6(4)(a)(i).

(iii) for systems required to evaluate the effectiveness of corrosion control treatments under R309-210-6(4)(a)(iii), the information required by that paragraph.

(iv) for systems required to install optimal corrosion control designated by the Director under R309-210-6(4)(a)(iv), a letter certifying that the system has completed installing that treatment.

(d) Source water treatment reporting requirements

By the applicable dates in R309-210-6(4)(b), systems shall provide the following information to the Director :

(i) if required under R309-210-6(4)(b)(ii)(A), their recommendation regarding source water treatment;

(ii) for systems required to install source water treatment under R309-210-6(4)(b)(ii)(B), a letter certifying that the system has completed installing the treatment designated by the Director within 24 months after the Director designated the treatment.

(e) Lead service line replacement reporting requirements

Systems shall report the following information to the Director to demonstrate compliance with the requirements of R309-210-6(4)(c):

(i) No later than 12 months after the end of a monitoring period in which a system exceeds the lead action level in sampling referred to in R309-210-6(4)(c)(i), the system must submit written documentation to the Director of the material evaluation conducted as required in R309-210-6(3)(a), identify the initial number of lead service lines in its distribution system at the time the system exceeds the lead action level, and provide the system's schedule for annually replacing at least 7 percent of the initial number of lead service lines in its distribution system.

(ii) No later than 12 months after the end of a monitoring period in which a system exceeds the lead action level in sampling referred to in R309-210-6(4)(c)(i), and every 12 months thereafter, the system shall demonstrate to the Director in writing that the system has either:

(A) replaced in the previous 12 months at least 7 percent of the initial lead service lines (or a greater number of lines specified by the Director under R309-210-6(4)(c)(v)) in its distribution system, or

(B) conducted sampling which demonstrates that the lead concentration in all service line samples from an individual line(s), taken pursuant to R309-210-6(3)(b)(iii), is less than or equal to 0.015 mg/L. In such cases, the total number of lines replaced and/or which meet the criteria in R309-210-6(4)(c)(iii) shall equal at least 7 percent of the initial number of lead lines identified under paragraph (e)(i) of this section (or the percentage specified by the Director under R309-210-6(4)(c)(v)).

(iii) The annual letter submitted to the Director under R309-210-6(8)(e)(ii) shall contain the following information:

(A) the number of lead service lines scheduled to be replaced during the previous year of the system's replacement schedule;

(B) the number and location of each lead service line replaced during the previous year of the system's replacement schedule;

(C) if measured, the water lead concentration and location of each lead service line sampled, the sampling method, and the date of sampling.

(iv) Systems shall also report any additional information as specified by the Director, and in a time and manner prescribed by the Director, to verify that all partial lead service line replacement activities have taken place.

(f) Public education program reporting requirements

(i) Any water system that is subject to the public education requirements in R309-210-6(7)shall, within ten days after the end of each period in which the system is required to perform public education in accordance with R309-210-6(7)(b), send written documentation to the Director that contains:

(A) A demonstration that the system has delivered the public education materials that meet the content requirements in R309-210-6(7)(a) and the delivery requirements in R309-210-6(7)(b); and

(B) A list of all the newspapers, radio stations, television stations, and facilities and organizations to which the system delivered public education materials during the period in which the system was required to perform public education tasks.

(ii) Unless required by the Director, a system that previously has submitted the information required by paragraph (f)(i)(B) of this section, as long as there have been no changes in the distribution list and the system certifies that the public education materials were distributed to the same list submitted previously.

(iii) No later than 3 months following the end of the monitoring period, each system must mail a sample copy of the consumer notification of tap results to the Director along with a certification that the notification has been distributed in a manner consistent with the requirements of R309-210-6(7)(d).

(g) Reporting of additional monitoring data

Any system which collects sampling data in addition to that required by this subpart shall report the results to the Director within the first ten day following the end of the applicable monitoring period under R309-210-6(3), R309-210-6(5) and R309-210-6(6) during which the samples are collected.

(h) Reporting of 90th percentile lead and copper concentrations where the Director calculates a system's 90th percentile concentrations. A water system is not required to report the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples during each monitoring period, as required by paragraph (a)(i)(D) of this section if:

(i) The Director has previously notified the water system that it will calculate the water system's 90th percentile lead and copper concentrations, based on the lead and copper tap results submitted pursuant to paragraph (h)(ii)(A) of this section, and has specified a date before the end of the applicable monitoring period by which the system must provide the results of lead and copper tap water samples;

(ii) The system has provided the following information to the Director by the date specified in paragraph (h)(i) of this section:

(A) The results of all tap samples for lead and copper including the location of each site and the criteria under R309-210-6(3)(a)(iii), (iv), (v), (vi), and/or (vii) under which the site was selected for the system's sampling pool, pursuant to paragraph (a)(i)(A) of this section; and

(B) An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation why sampling sites have changed; and

(iii) The Director has provided the results of the 90th percentile lead and copper calculations, in writing, to the water system before the end of the monitoring period.

R309-210-7. Asbestos Distribution System Monitoring.

(1) The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in R309-200-5(1) shall be conducted as follows:

(a) Each community and non-transient non-community water system is required to monitor for asbestos during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993.

(b) If the system believes it is not vulnerable due to corrosion of asbestos-cement pipe, it may apply to the Director for a waiver of the monitoring requirement in paragraph (a) of this section. If the Director grants the waiver, the system is not required to monitor for asbestos.

(c) The Director may grant a waiver based on a consideration of the use of asbestos-cement pipe for finished water distribution and the corrosive nature of the water.

(d) A waiver remains in effect until the completion of the three-year compliance period. Systems not receiving a waiver must monitor in accordance with the provisions of paragraph (a) of this section.

(2) A system vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

(3) A system vulnerable to asbestos contamination due both to its source water supply (as specified in R309-205-5(2)) and corrosion of asbestos-cement pipe shall take one sample at

a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

(4) A system which exceeds the maximum contaminant levels as determined in R309-205-5(1)(g) shall monitor quarterly beginning in the next quarter after the violation occurred.

(5). The Director may decrease the quarterly monitoring requirement to the frequency specified in paragraph (a) of this section provided the Director has determined that the system is reliably and consistently below the maximum contaminant level. In no case can the Director make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface (or combined surface/ground) water system takes a minimum of four quarterly samples.

(6) If monitoring data collected after January 1, 1990 are generally consistent with the requirements of R309-210-7, then the Director may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

R309-210-8. Disinfection Byproducts - Stage 1 Requirements.

(1) General requirements.

The requirements in this sub-section establish criteria under which community and non-transient non-community water systems that add a chemical disinfectant to the water in any part of the drinking water treatment process, shall modify their practices to meet MCLs and MRDLs in R309-200-5(3)(c) and meet treatment technique requirements in R309-215-12 and 13. The requirements of this sub-section also establish criteria under which transient non-community water systems that use chlorine dioxide shall modify their practices to meet MRDLs for chlorine dioxide in R309-200-5(3)(c).

(a) Compliance dates.

(i) Community and Non-transient non-community water systems. Surface water systems serving 10,000 or more persons must comply with this section beginning January 1, 2002. Surface water systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this section beginning January 1, 2004.

(ii) Transient non-community water systems. Surface water systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide in this section beginning January 1, 2002. Surface water systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply

with any requirements for chlorine dioxide in this section beginning January 1, 2004.

(b) Systems must take all samples during normal operating conditions.

(c) Systems may consider multiple wells drawing water from a single aquifer as one treatment plant for determining the minimum number of TTHM and HAA5 samples required, with approval from the Director.

(d) Failure to monitor in accordance with the monitoring plan required under paragraph (5) of this section is a monitoring violation.

(e) Failure to monitor will be treated as a violation for the entire period covered by the annual average where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MCLs or MRDLs.

(f) Systems may use only data collected under the provisions of this section or the federal Information Collection Rule,(40 CFR, Part 141, Subpart M) to qualify for reduced monitoring.

(2) Monitoring requirements for disinfection byproducts.

(a) TTHMs and HAA5s

(i) Routine monitoring. Systems must monitor at the frequency indicated in the following:

(A) If a system elects to sample more frequently than the minimum required, at least 25 percent of all samples collected each quarter (including those taken in excess of the required frequency) must be taken at locations that represent the maximum residence time of the water in the distribution system. The remaining samples must be taken at locations representative of at least average residence time in the distribution system.

(B) Surface water systems serving at least 10,000 persons shall take four water samples per quarter per treatment plant. At least 25 percent of all samples collected each quarter shall be at locations representing maximum residence time. The remaining samples taken at locations representative of at least average residence time in the distribution system and representing the entire distribution system, taking into account number of persons served, different sources of water, and different treatment methods.

(C) Surface water systems serving from 500 to 9,999 persons shall take one water sample per quarter per treatment plant at a locations representing maximum residence time.

(D) Surface water systems serving fewer than 500 persons shall take one sample per year per treatment plant during month of warmest water temperature at a location representing maximum residence time. If the sample (or average of annual samples, if more than one sample is taken) exceeds the MCL, the system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until the system meets reduced monitoring criteria in paragraph (2)(a)(v) of this section.

(E) Systems using only ground water not under direct influence of surface water using chemical disinfectant and serving at least 10,000 persons shall take one water sample per quarter per treatment plant at a locations representing maximum residence time.

(F) Systems using only ground water not under direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons shall take one sample per year per treatment plant during month of warmest water temperature at a location representing maximum residence time. If the sample (or average of annual samples, if more than one sample is taken) exceeds the MCL, the system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until the system meets criteria in paragraph (2)(a)(v) of this section for reduced monitoring.

(ii) Systems may reduce monitoring, except as otherwise provided, if the system has monitored for at least one year and is in accordance with the following paragraphs. Any Surface water system serving fewer than 500 persons may not reduce its monitoring to less than one sample per treatment plant per year.

(A) A surface water system serving at least 10,000 persons which has a source water annual average TOC level, before any treatment, of less than or equal to 4.0 mg/L and has a TTHM annual average of less than or equal to 0.040 mg/L and has a HAA5 annual average of less than or equal to 0.030 mg/L may reduce monitoring to one sample per treatment plant per quarter at a distribution system location reflecting maximum residence time.

(B) A surface water system serving from 500 to 9,999 persons which has a source water annual average TOC level, before any treatment,

of less than or equal to 4.0 mg/L and has a TTHM annual average of less than or equal to 0.040 mg/L and has a HAA5 annual average of less than or equal to 0.030 mg/L may reduce monitoring to one sample per treatment plant per year at a distribution system location reflecting maximum residence time during the month of warmest water temperature.

(C) A system using only ground water not under direct influence of surface water using chemical disinfectant and serving at least 10,000 persons that has a TTHM annual average of less than or equal to 0.040 mg/L and has a HAA5 annual average of less than or equal to 0.030 mg/L may reduce monitoring to one sample per treatment plant per year at a distribution system location reflecting maximum residence time during the month of warmest water temperature.

(D) A system using only ground water not under direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons that has a TTHM annual average of less than or equal to 0.040 mg/L and has a HAA5 annual average of less than or equal to 0.030 mg/L for two consecutive years or has a TTHM annual average of less than or equal to 0.020 mg/L and has a HAA5 annual average of less than or equal to 0.015mg/L for one year may reduce monitoring to one sample per treatment plant per three year monitoring cycle at a distribution system location reflecting maximum residence time during the month of warmest water temperature, with the three-year cycle beginning on January 1 following the quarter in which the system qualifies for reduced monitoring.

(iii) Monitoring requirements for source water TOC in order to qualify for reduced monitoring for TTHM and HAA5 under paragraph (2)(a)(ii) of this section, surface water systems not monitoring under the provisions of paragraph (d) of this section must take monthly TOC samples every 30 days at a location prior to any treatment, beginning April 1, 2008 or earlier, if specified by the Director. In addition to meeting other criteria for reduced monitoring in paragraph (2)(a)(ii) of this section, the source water TOC running annual average must be equal to or less than 4.0 mg/L (based on the most recent four quarters of monitoring) on a continuing basis at each treatment plant to reduce or remain on reduced monitoring for TTHM and HAA5. Once qualified for reduced monitoring for TTHM and HAA5 under paragraph (2)(a)(ii) of this section, a system may reduce source water TOC monitoring to quarterly TOC samples taken every 90 days at a location prior to any treatment.

(iv) Systems on a reduced monitoring schedule may remain on that reduced schedule as long as the average of all samples taken in the year (for systems

which must monitor quarterly) or the result of the sample (for systems which must monitor no more frequently than annually) is no more than 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively. Systems that do not meet these levels must resume monitoring at the frequency identified in paragraph (2)(a)(i) of this section in the quarter immediately following the monitoring period in which the system exceeds 0.060 mg/L or 0.045 mg/L for TTHM or HAA5, respectively. For systems using only ground water not under the direct influence of surface water and serving fewer than 10,000 persons, if either the TTHM annual average is greater than 0.080 mg/L or the HAA5 annual average is greater than 0.060 mg/L, the system must go to the increased monitoring identified in paragraph (2)(a)(i) of this section in the quarter immediately following the monitoring period in which the system exceeds 0.080 mg/L or 0.060 mg/L for TTHMs or HAA5 respectively.

(v) Systems on increased monitoring may return to routine monitoring if, after at least one year of monitoring their TTHM annual average is less than or equal to 0.060 mg/L and their HAA5 annual average is less than or equal to 0.045 mg/L.

(vi) The Director may return a system to routine monitoring when appropriate to protect public health.

(b) Chlorite. Community and non-transient non-community water systems using chlorine dioxide, for disinfection or oxidation, must conduct monitoring for chlorite.

(i) Routine monitoring.

(A) Daily monitoring. Systems must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the chlorite MCL, the system must take additional samples in the distribution system the following day at the locations required by paragraph (2)(b)(ii) of this section, in addition to the sample required at the entrance to the distribution system.

(B) Monthly monitoring. Systems must take a three-sample set each month in the distribution system. The system must take one sample at each of the following locations: near the first customer, at a location representative of average residence time, and at a location reflecting maximum residence time in the distribution system. Any additional routine sampling must be conducted in the same manner (as three-sample sets, at the specified locations). The system may use the results of additional monitoring conducted under paragraph (2)(b)(ii) of this section to meet the requirement for monitoring in this paragraph.

(ii) Additional monitoring. On each day following a routine sample monitoring result that exceeds the chlorite MCL at the entrance to the distribution system, the system is required to take three chlorite distribution system samples at the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

(iii) Reduced monitoring.

(A) Chlorite monitoring at the entrance to the distribution system required by paragraph (2)(b)(i)(A) of this section may not be reduced.

(B) Chlorite monitoring in the distribution system required by paragraph (2)(b)(i)(B) of this section may be reduced to one three-sample set per quarter after one year of monitoring where no individual chlorite sample taken in the distribution system under paragraph (2)(b)(i)(B) of this section has exceeded the chlorite MCL and the system has not been required to conduct monitoring under paragraph (2)(b)(ii) of this section. The system may remain on the reduced monitoring schedule until either any of the three individual chlorite samples taken monthly in the distribution system under paragraph (2)(b)(i)(B) of this section exceeds the chlorite MCL or the system is required to conduct monitoring under paragraph (2)(b)(ii) of this section, at which time the system must revert to routine monitoring.

(c) Bromate.

(i) Routine monitoring. Community and nontransient noncommunity systems using ozone, for disinfection or oxidation, must take one sample per month for each treatment plant in the system using ozone. Systems must take samples monthly at the entrance to the distribution system while the ozonation system is operating under normal conditions.

(ii) Reduced monitoring.

(A) Until March 31, 2009, systems required to analyze for bromate may reduce monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly bromide measurements for one year. The system may remain on reduced bromate monitoring until the running annual average source water bromide concentration, computed quarterly, is equal to or greater than 0.05 mg/L based upon representative

monthly measurements. If the running annual average source water bromide concentration is greater than or equal to 0.05 mg/L, the system must resume routine monitoring required by paragraph (2)(c)(i) of this section in the following month.

(B) Beginning April 1, 2009, systems may no longer use the provisions of paragraph (2)(c)(ii)(A) of this section to qualify for reduced monitoring. A system required to analyze for bromate may reduce monitoring from monthly to quarterly, if the system's running annual average bromate concentration is equal to or less than 0.0025 mg/L based on monthly bromate measurements under paragraph (2)(c)(i) of this section for the most recent four quarters, with samples analyzed using Method 317.0 Revision 2.0, 326.0 or 321.8. If a system has qualified for reduced bromate monitoring under paragraph (2)(c)(ii)(A) of this section, that system may remain on reduced monitoring as long as the running annual average of quarterly bromate samples is less than or equal to 0.0025 mg/L based on samples analyzed using Method 317.0 Revision 2.0, 326.0 or 321.8. If the running annual average bromate concentration is greater than 0.0025 mg/L, the system must resume routine monitoring required by (2)(c)(i) of this section.

(3) Monitoring requirements for disinfectant residuals.

(a) Chlorine and chloramines.

(i) Routine monitoring. Community and nontransient noncommunity water systems that use chlorine or chloramines must measure the residual disinfectant level in distribution system at the same point in the distribution system and at the same time as total coliforms are sampled, as specified in R309-210-5. The Director may allow a public water system which uses both disinfected and undisinfected sources to take disinfectant residual samples at points other than the total coliform sampling points if the Director determines that such sampling points are more representative of treated (disinfected) water quality within the distribution system. Water systems shall take a minimum of three residual disinfectant level samples each week.

(ii) In addition, ground water systems shall take the following readings at each facility a minimum of three times a week: the total volume of water treated; the type and amount of disinfectant used in treating the water (clearly indicating the weight if gas feeders are used, or the percent solution and volume fed if liquid feeders are used); and the setting of the rotometer valve or injector pump. Surface water systems may use the results of residual disinfectant concentration sampling conducted under R309-215-10(3) for systems which filter, in lieu of taking separate samples.

(iii) Reduced monitoring. Monitoring may not be reduced.

(b) Chlorine Dioxide.

(i) Routine monitoring. Community, nontransient noncommunity, and transient noncommunity water systems that use chlorine dioxide for disinfection or oxidation must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the MRDL, the system must take samples in the distribution system the following day at the locations required by paragraph (3)(b)(ii) of this section, in addition to the sample required at the entrance to the distribution system.

(ii) Additional monitoring. On each day following a routine sample monitoring result that exceeds the MRDL, the system is required to take three chlorine dioxide distribution system samples. If chlorine dioxide or chloramines are used to maintain a disinfectant residual in the distribution system, or if chlorine is used to maintain a disinfectant residual in the distribution system and there are no disinfection addition points after the entrance to the distribution system (i.e., no booster chlorination), the system must take three samples as close to the first customer as possible, at intervals of at least six hours. If chlorine is used to maintain a disinfectant residual in the distribution system and there are one or more disinfection addition points after the entrance to the distribution system (i.e., booster chlorination), the system must take one sample at each of the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

(iii) Reduced monitoring. Chlorine dioxide monitoring may not be reduced.

(4) Bromide.

Systems required to analyze for bromate may reduce bromate monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly measurements for one year. The system must continue bromide monitoring to remain on reduced bromate monitoring.

(5) Monitoring plans.

Each system required to monitor under this section must develop and implement a monitoring plan. The system must maintain the plan and make it available for inspection by the Director and the general public no later than 30 days following the applicable

compliance dates in R309-210-8(1)(a). All Surface water systems serving more than 3300 people must submit a copy of the monitoring plan to the Director no later than the date of the first report required under R309-105-16(2). The Director may also require the plan to be submitted by any other system. After review, the Director may require changes in any plan elements. The plan must include at least the following elements.

(a) Specific locations and schedules for collecting samples for any parameters included in this subpart.

(b) How the system will calculate compliance with MCLs, MRDLs, and treatment techniques.

(c) If approved for monitoring as a consecutive system, or if providing water to a consecutive system, the Director may modify the monitoring requirements treating the systems as a single distribution system, however, the sampling plan shall reflect the entire distribution system of all interconnected systems.

(6) Compliance requirements.

(a) General requirements.

(i) Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system fails to monitor for TTHM, HAA5, or bromate, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average. Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MRDLs for chlorine and chloramines, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average.

(ii) All samples taken and analyzed under the provisions of this section shall be included in determining compliance, even if that number is greater than the minimum required.

(iii) If, during the first year of monitoring under R309-210-8, any individual quarter's average will cause the running annual average of that system to exceed the MCL, the system is out of compliance at the end of that quarter.

(b) Disinfection byproducts.

(i) TTHMs and HAA5.

(A) For systems monitoring quarterly, compliance with MCLs in R309-200-5(3)(c) shall be based on a running annual arithmetic

average, computed quarterly, of quarterly arithmetic averages of all samples collected by the system as prescribed by R309-210-8(2)(a).

(B) For systems monitoring less frequently than quarterly, systems demonstrate MCL compliance if the average of samples taken that year under the provisions of R309-210-8(2)(a) does not exceed the MCLs in R309-200-5(3)(c). If the average of these samples exceeds the MCL, the system shall increase monitoring to once per quarter per treatment plant and such a system is not in violation of the MCL until it has completed one year of quarterly monitoring, unless the result of fewer than four quarters of monitoring will cause the running annual average to exceed the MCL, in which case the system is in violation at the end of that quarter. Systems required to increase monitoring frequency to quarterly monitoring shall calculate compliance by including the sample which triggered the increased monitoring plus the following three quarters of monitoring.

(C) If the running annual arithmetic average of quarterly averages covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and shall notify the public pursuant to R309-220, in addition to reporting to the Director pursuant to R309-105-16.

(D) If a PWS fails to complete four consecutive quarters of monitoring, compliance with the MCL for the last four-quarter compliance period shall be based on an average of the available data.

(ii) Chlorite. Compliance shall be based on an arithmetic average of each three sample set taken in the distribution system as prescribed by R309-210-8(2)(b)(i)(B) and (2)(b)(ii). If the arithmetic average of any three sample sets exceeds the MCL, the system is in violation of the MCL and shall notify the public pursuant to R309-220, in addition to reporting to the Director pursuant to R309-105-16.

(iii) Bromate. Compliance shall be based on a running annual arithmetic average, computed quarterly, of monthly samples (or, for months in which the system takes more than one sample, the average of all samples taken during the month) collected by the system as prescribed by R309-210-8(2)(c). If the average of samples covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and shall notify the public pursuant to R309-220, in addition to reporting to the Director pursuant to R309-105-16. If a PWS fails to complete 12 consecutive months' monitoring, compliance with the MCL for the last four-quarter compliance period shall be based on an average of the available data.

(c) Disinfectant residuals.

(i) Chlorine and chloramines.

(A) Compliance shall be based on a running annual arithmetic average, computed quarterly, of monthly averages of all samples collected by the system under R309-210-8(3)(a). If the average covering any consecutive four-quarter period exceeds the MRDL, the system is in violation of the MRDL and shall notify the public pursuant to R309-220, in addition to reporting to the Director pursuant to R309-105-16.

(B) In cases where systems switch between the use of chlorine and chloramines for residual disinfection during the year, compliance shall be determined by including together all monitoring results of both chlorine and chloramines in calculating compliance. Reports submitted pursuant to R309-105-16 shall clearly indicate which residual disinfectant was analyzed for each sample.

(ii) Chlorine dioxide.

(A) Acute violations. Compliance shall be based on consecutive daily samples collected by the system under R309-210-8(3)(b). If any daily sample taken at the entrance to the distribution system exceeds the MRDL, and on the following day one (or more) of the three samples taken in the distribution system exceed the MRDL, the system is in violation of the MRDL and shall take immediate corrective action to lower the level of chlorine dioxide below the MRDL and shall notify the public pursuant to the procedures for acute health risks in R309-220-5. Failure to take samples in the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system will also be considered an MRDL violation and the system shall notify the public of the violation in accordance with the provisions for acute violations under R309-220-5 in addition to reporting the Director pursuant to R309-105-16.

(B) Nonacute violations. Compliance shall be based on consecutive daily samples collected by the system under R309-210-8(3)(b). If any two consecutive daily samples taken at the entrance to the distribution system exceed the MRDL and all distribution system samples taken are below the MRDL, the system is in violation of the MRDL and shall take corrective action to lower the level of chlorine dioxide below the MRDL at the point of sampling and will notify the public pursuant to the procedures for nonacute health risks in R309-220-6 in addition to reporting to the Director pursuant to R309-105-16. Failure to monitor at the entrance to the distribution system the

day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system is also an MRDL violation and the system shall notify the public of the violation in accordance with the provisions for nonacute violations under R309-220-6 in addition to reporting to the Director pursuant to R309-105-16.

R309-210-9. Disinfection Byproducts - Initial Distribution System Evaluations.

(1) General requirements.

(a) The requirements of this sub-section establish monitoring and other requirements for identifying R309-210-10 compliance monitoring locations for determining compliance with maximum contaminant levels for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5). The water system must use an Initial Distribution System Evaluation (IDSE) to determine locations with representative high TTHM and HAA5 concentrations throughout the distribution system. IDSEs are used in conjunction with, but separate from, R309-210-8 compliance monitoring, to identify and select R309-210-10 compliance monitoring locations.

(b) Applicability. Community water systems that uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light; or if the system is a non-transient non-community water systems that serves at least 10,000 people and uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light are subject to these requirements.

(c) Schedule. The water system must comply with the requirements of this subpart on the schedule in paragraph (c)(i).

(i) For water systems that are not part of a combined distribution system and systems that serve the largest population in the combined distribution system.

(A) For water systems that serve a population greater than or equal to 100,000:

(I) The water system must submit a standard monitoring plan or system specific study plan or 40/30 certification to the Director by or receive very small system waiver from the Director by October 1, 2006.

(II) The water system must complete the standard monitoring or system specific study by September 30, 2008.

(III) The water system must submit the IDSE report to the Director by January 1, 2009.

(B) For water systems that serve a population from 50,000 to 99,999:

(I) The water system must submit a standard monitoring plan or system specific study plan or 40/30 certification to the Director by or receive very small system waiver from the Director by April 1, 2007.

(II) The water system must complete the standard monitoring or system specific study by March 31, 2009.

(III) The water system must submit the IDSE report to the Director by July 1, 2009.

(C) For water systems that serve a population from 10,000 to 49,999:

(I) The water system must submit a standard monitoring plan or system specific study plan or 40/30 certification to the Director by or receive very small system waiver from the Director by October 1, 2007.

(II) The water system must complete the standard monitoring or system specific study by September 30, 2009.

(III) The water system must submit the IDSE report to the Director by January 1, 2010.

(D) For community water systems that serve a population less than 10,000:

(I) The water system must submit a standard monitoring plan or system specific study plan or 40/30 certification to the Director by or receive very small system waiver from the Director by April 1, 2008.

(II) The water system must complete the standard monitoring or system specific study by March 31, 2010.

(III) The water system must submit the IDSE report to the Director by July 1, 2010.

(ii) For other water systems that are part of a combined distribution system:

(A) For wholesale systems or consecutive systems:

(I) The water system must submit a standard monitoring plan or system specific study plan or 40/30 certification to the Director by or receive very small system waiver from the Director at the same time as the system with the earliest compliance date in the combined distribution system.

(II) The water system must complete the standard monitoring or system specific study at the same time as the system with the earliest compliance date in the combined distribution system.

(III) The water system must submit the IDSE report to the Director by at the same time as the system with the earliest compliance date in the combined distribution system.

(iii) If, within 12 months after the date the water system is required to submit the information in (i)(A)(I), (B)(I), (C)(I), (D)(I) and (ii)(A)(I) above, the Director does not approve the water system plan or notify the water system that it has not yet completed its review, the water system may consider the plan that was submitted as approved. The water system must implement that plan and must complete standard monitoring or a system specific study no later than the date identified in (i)(A)(II), (B)(II), (C)(II), (D)(II) and (ii)(A)(II) above.

(iv) The water system must submit the 40/30 certification under R309-210-9(4) by the date identified in (i)(A)(II), (B)(II), (C)(II), (D)(II) and (ii)(A)(II) above.

(v) If, within three months after the date identified in (i)(A)(III), (B)(III), (C)(III), (D)(III) and (ii)(A)(III) above (nine months after the date identified in this column if the water system must comply on the schedule in paragraph (c)(i)(C) of this section), the Director does not approve the IDSE report or notify the water system that it has not yet completed its review, the water system may consider the report submitted as approved and must implement the recommended R309-210-10 monitoring as required.

(vi) For the purpose of the schedule in paragraph (c)(i) through (c)(v) of this section, the Director may determine that the combined distribution system does not include certain consecutive systems based on factors such as receiving water from a wholesale system only on an emergency basis or receiving only a small percentage and small volume of water from a wholesale system. The Director may also determine that the combined

distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.

(d) The water system must conduct standard monitoring that meets the requirements in R309-210-9(2), or a system specific study that meets the requirements in R309-210-9(3), or certify to the Director that the water system meet 40/30 certification criteria under R309-210-9(4), or qualify for a very small system waiver under R309-210-9(5).

(i) The water system must have taken the full complement of routine TTHM and HAA5 compliance samples required of a system with the population and source water under R309-210-8 (or the water system must have taken the full complement of reduced TTHM and HAA5 compliance samples required of a system with the population and source water under R309-210-8 if the water system meets reduced monitoring criteria under R309-210-8) during the period specified in R309-210-9(4)(a) to meet the 40/ 30 certification criteria in R309-210-9(4) the water system must have taken TTHM and HAA5 samples under R309-200-4(3) and R309-210-8 to be eligible for the very small system waiver in R309-210-9(5).

(ii) If the water system has not taken the required samples, the water system must conduct standard monitoring that meets the requirements in R309-210-9(2), or a system specific study that meets the requirements in R309-210-9(3).

(e) The water system must use only the analytical methods specified in R309-200-4(3), or otherwise approved by EPA for monitoring under this subpart, to demonstrate compliance with the requirements of this subpart.

(f) IDSE results will not be used for the purpose of determining compliance with MCLs in R309-200-5(3)(c).

(2) Standard monitoring.

(a) Standard monitoring plan. The standard monitoring plan must comply with paragraphs (a)(i) through (a)(iv) of this section. The water system must prepare and submit the standard monitoring plan to the Director according to the schedule in R309-210-9(1)(c).

(i) The standard monitoring plan must include a schematic of the distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating locations and dates of all projected standard monitoring, and all projected R309-210-8 compliance monitoring.

(ii) The standard monitoring plan must include justification of standard monitoring location selection and a summary of data the water system relied on to justify standard monitoring location selection.

(iii) The standard monitoring plan must specify the population served and system type (surface water or ground water).

(iv) The water system must retain a complete copy of the standard monitoring plan submitted under this paragraph (a), including any Director modification of the standard monitoring plan, for as long as the water system is required to retain the IDSE report under R309-105-17(8).

(b) Standard monitoring.

(i) The water system must monitor as indicated in paragraph (b)(i). The water system must collect dual sample sets at each monitoring location. One sample in the dual sample set must be analyzed for TTHM. The other sample in the dual sample set must be analyzed for HAA5. The water system must conduct one monitoring period during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature. The water system must review available compliance, study, or operational data to determine the peak historical month for TTHM or HAA5 levels or warmest water temperature.

(A) Surface water systems serving less than 500 population which are consecutive systems.

(I) One monitoring period per year, dual sample sets must be taken during the peak historical month. Two dual samples sets must be collected per monitoring period.

(II) One dual sample set must be taken at the high TTHM location in the distribution system.

(III) One dual sample set must be taken near the entry point of the disinfected water into the distribution system.

(B) Surface water systems serving less than 500 population which are non-consecutive systems.

(I) One monitoring period per year, dual sample sets must be taken during the peak historical month. Two dual samples sets must be collected per monitoring period.

(II) One dual sample set must be taken at the high TTHM location in the distribution system.

(III) One dual sample set must be taken at the high HAA5 location in the distribution system.

(C) Surface water systems serving between 500 to 3,300 population which are consecutive systems.

(I) Four monitoring periods per year, dual sample sets must be taken every 90 days. Two dual samples sets must be collected per monitoring period.

(II) One dual sample set must be taken at the high TTHM location in the distribution system.

(III) One dual sample set must be taken near the entry point of the disinfected water into the distribution system.

(D) Surface water systems serving between 500 to 3,300 population which are non-consecutive systems.

(I) Four monitoring periods per year, dual sample sets must be taken every 90 days. Two dual samples sets must be collected per monitoring period.

(II) One dual sample set must be taken at the high TTHM location in the distribution system.

(III) One dual sample set must be taken at the high HAA5 location in the distribution system.

(E) Surface water systems serving between 3,301 to 9,999 population.

(I) Four monitoring periods per year, dual sample sets must be taken every 90 days. Four dual samples sets must be collected per monitoring period.

(II) Two dual sample sets must be taken at the high TTHM locations in the distribution system.

(III) One dual sample set must be taken at the high HAA5 location in the distribution system.

(IV) One dual sample set must be taken at an average residence time of the disinfected water in the distribution system.

(F) Surface water systems serving between 10,000 to 49,999 population.

(I) Six monitoring periods per year, dual sample sets must be taken every 60 days. Eight dual samples sets must be collected per monitoring period.

(II) Three dual sample sets must be taken at the high TTHM locations in the distribution system.

(III) Two dual sample sets must be taken at the high HAA5 locations in the distribution system.

(IV) Two dual sample sets must be taken at an average residence time of the disinfected water in the distribution system.

(V) One dual sample set must be taken near the entry point of the disinfected water into the distribution system.

(G) Surface water systems serving between 50,000 to 249,999 population.

(I) Six monitoring periods per year, dual sample sets must be taken every 60 days. 16 dual samples sets must be collected per monitoring period.

(II) Five dual sample sets must be taken at the high TTHM locations in the distribution system.

(III) Four dual sample sets must be taken at the high HAA5 locations in the distribution system.

(IV) Four dual sample sets must be taken at an average residence time of the disinfected water in the distribution system.

(V) Three dual sample sets must be taken near the entry point of the disinfected water into the distribution system.

(H) Surface water systems serving between 250,000 to 999,999 population.

(I) Six monitoring periods per year, dual sample sets must be taken every 60 days. 24 dual samples sets must be collected per monitoring period.

(II) Eight dual sample sets must be taken at the high TTHM locations in the distribution system.

(III) Six dual sample sets must be taken at the high HAA5 locations in the distribution system.

(IV) Six dual sample sets must be taken at an average residence time of the disinfected water in the distribution system.

(V) Four dual sample sets must be taken near the entry point of the disinfected water into the distribution system.

(I) Surface water systems serving between 1,000,000 to 4,999,999 population.

(I) Six monitoring periods per year, dual sample sets must be taken every 60 days. 32 dual samples sets must be collected per monitoring period.

(II) Ten dual sample sets must be taken at the high TTHM locations in the distribution system.

(III) Eight dual sample sets must be taken at the high HAA5 locations in the distribution system.

(IV) Eight dual sample sets must be taken at an average residence time of the disinfected water in the distribution system.

(V) Six dual sample sets must be taken near the entry point of the disinfected water into the distribution system.

(J) Surface water systems serving 5,000,000 or more population.

(I) Six monitoring periods per year, dual sample sets must be taken every 60 days. 40 dual samples sets must be collected per monitoring period.

(II) Twelve dual sample sets must be taken at the high TTHM locations in the distribution system.

(III) Ten dual sample sets must be taken at the high HAA5 locations in the distribution system.

(IV) Ten dual sample sets must be taken at an average residence time of the disinfected water in the distribution system.

(V) Eight dual sample sets must be taken near the entry point of the disinfected water into the distribution system.

(K) Ground water systems serving less than 500 population which are consecutive systems.

(I) One monitoring period per year, dual sample sets must be taken during the peak historical month. Two dual samples sets must be collected per monitoring period.

(II) One dual sample set must be taken at the high TTHM location in the distribution system.

(III) One dual sample set must be taken near the entry point of the disinfected water into the distribution system.

(L) Ground water systems serving less than 500 population which are non-consecutive systems.

(I) One monitoring period per year, dual sample sets must be taken during the peak historical month. Two dual samples sets must be collected per monitoring period.

(II) One dual sample set must be taken at the high TTHM location in the distribution system.

(III) One dual sample set must be taken at the high HAA5 location in the distribution system.

(M) Ground water systems serving between 500 to 9,999 population.

(I) Four monitoring periods per year, dual sample sets must be taken every 90 days. Two dual samples sets must be collected per monitoring period.

(II) One dual sample set must be taken at the high TTHM location in the distribution system.

(III) One dual sample set must be taken at the high HAA5 location in the distribution system.

(N) Ground water systems serving between 10,000 to 99,999 population.

(I) Four monitoring periods per year, dual sample sets must be taken every 90 days. Six dual samples sets must be collected per monitoring period.

(II) Two dual sample sets must be taken at the high TTHM locations in the distribution system.

(III) Two dual sample sets must be taken at the high HAA5 locations in the distribution system.

(IV) One dual sample set must be taken at an average residence time of the disinfected water in the distribution system.

(V) One dual sample set must be taken near the entry point of the disinfected water into the distribution system.

(O) Ground water systems serving between 100,000 to 499,999 population.

(I) Four monitoring periods per year, dual sample sets must be taken every 90 days. Eight dual samples sets must be collected per monitoring period.

(II) Three dual sample sets must be taken at the high TTHM locations in the distribution system.

(III) Three dual sample sets must be taken at the high HAA5 locations in the distribution system.

(IV) One dual sample set must be taken at an average residence time of the disinfected water in the distribution system.

(V) One dual sample set must be taken near the entry point of the disinfected water into the distribution system.

(P) Ground water systems serving 500,000 or greater population.

(I) Four monitoring periods per year, dual sample sets must be taken every 90 days. Twelve dual samples sets must be collected per monitoring period.

(II) Four dual sample sets must be taken at the high TTHM locations in the distribution system.

(III) Four dual sample sets must be taken at the high HAA5 locations in the distribution system.

(IV) Two dual sample sets must be taken at an average residence time of the disinfected water in the distribution system.

(V) Two dual sample sets must be taken near the entry point of the disinfected water into the distribution system.

(Q) A dual sample set (i.e., a TTHM and an HAA5 sample) must be taken at each monitoring location during each monitoring period.

(R) The peak historical month is the month with the highest TTHM or HAA5 levels or the warmest water temperature.

(ii) The water system must take samples at locations other than the existing R309-210-8 monitoring locations. Monitoring locations must be distributed throughout the distribution system.

(iii) If the number of entry points to the distribution system is fewer than the specified number of entry point monitoring locations, excess entry point samples must be replaced equally at high TTHM and HAA5 locations. If there is an odd extra location number, the water system must take a sample at a high TTHM location. If the number of entry points to the distribution system is more than the specified number of entry point monitoring locations, the water system must take samples at entry points to the distribution system having the highest annual water flows.

(iv) The system monitoring under this paragraph (b) may not be reduced under the provisions of R309-105-5(2).

(c) IDSE report. The IDSE report must include the elements required in paragraphs (c)(i) through (c)(iv) of this section. The water system must submit the IDSE report to the Director according to the schedule in R309-210-9(1)(c).

(i) The IDSE report must include all TTHM and HAA5 analytical results from R309-210-8 compliance monitoring and all standard monitoring conducted during the period of the IDSE as individual analytical results and

LRAAs presented in a tabular or spreadsheet format acceptable to the Director. If changed from the standard monitoring plan submitted under paragraph (a) of this section, the report must also include a schematic of the distribution system, the population served, and system type (surface water or ground water).

(ii) The IDSE report must include an explanation of any deviations from the approved standard monitoring plan.

(iii) The water system must recommend and justify R309-210-10 compliance monitoring locations and timing based on the protocol in R309-210-9(6).

(iv) The water system must retain a complete copy of the IDSE report submitted under this section for 10 years after the date that the water system submitted the report. If the Director modifies the R309-210-10 monitoring requirements that the water system recommended in the IDSE report or if the Director approves alternative monitoring locations, the water system must keep a copy of the Director's notification on file for 10 years after the date of the Director's notification. The water system must make the IDSE report and any Director notification available for review by the Director or the public.

(3) System specific studies.

(a) System specific study plan. The water system specific study plan must be based on either existing monitoring results as required under paragraph (a)(i) of this section or modeling as required under paragraph (a)(ii) of this section. The water system must prepare and submit the system specific study plan to the Director according to the schedule in R309-210-9(1)(c).

(i) Existing monitoring results. The water system may comply by submitting monitoring results collected before the water system is required to begin monitoring under R309-210-9(1)(c). The monitoring results and analysis must meet the criteria in paragraphs (a)(i)(A) and (a)(i)(B) of this section.

(A) Minimum requirements.

(I) TTHM and HAA5 results must be based on samples collected and analyzed in accordance with R309-200-4(3). Samples must be collected no earlier than five years prior to the study plan submission date.

(II) The monitoring locations and frequency must meet the conditions identified in this paragraph (a)(i)(A)(II). Each

location must be sampled once during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature for every 12 months of data submitted for that location. Monitoring results must include all R309-210-8 compliance monitoring results plus additional monitoring results as necessary to meet minimum sample requirements.

(III) Surface water systems serving a population less than 500 shall have data from:

(aa) three monitoring locations; and

(bb) three samples for each TTHM and HAA5.

(IV) Surface water systems serving a population between 500 to 3,300 shall have data from:

(aa) three monitoring locations; and

(bb) nine samples each for TTHM and HAA5.

(V) Surface water systems serving a population between 3,301 to 9,999 shall have data from:

(aa) six monitoring locations; and

(bb) 36 samples each for TTHM and HAA5.

(VI) Surface water systems serving a population between 10,000 to 49,999 shall have data from:

(aa) 12 monitoring locations; and

(bb) 72 samples each for TTHM and HAA5.

(VII) Surface water systems serving a population between 50,000 to 249,999 shall have data from:

(aa) 24 monitoring locations; and

(bb) 144 samples each for TTHM and HAA5.

(VIII) Surface water systems serving a population between 250,000 to 999,999 shall have data from:

(aa) 36 monitoring locations; and

(bb) 216 samples each for TTHM and HAA5.

(IX) Surface water systems serving a population between 1,000,000 to 4,999,999 shall have data from:

(aa) 48 monitoring locations; and

(bb) 288 samples each for TTHM and HAA5.

(X) Surface water systems serving a population 5,000,000 or greater shall have data from:

(aa) 60 monitoring locations; and

(bb) 360 samples each for TTHM and HAA5.

(XI) Ground water systems serving a population less than 500 shall have data from:

(aa) three monitoring locations; and

(bb) three samples for each TTHM and HAA5.

(XII) Ground water systems serving a population between 500 to 9,999 shall have data from:

(aa) three monitoring locations; and

(bb) nine samples each for TTHM and HAA5.

(XIII) Ground water systems serving a population between 10,000 to 99,999 shall have data from:

(aa) 12 monitoring locations; and

(bb) 48 samples each for TTHM and HAA5.

(XIV) Ground water systems serving a population between 100,000 to 499,999 shall have data from:

(aa) 18 monitoring locations; and

(bb) 72 samples each for TTHM and HAA5.

(XV) Ground water systems serving a population of 500,000 or greater shall have data from:

(aa) 24 monitoring locations; and

(bb) 96 samples each for TTHM and HAA5.

(B) Reporting monitoring results. The water system must report the information in this paragraph (a)(i)(B).

(I) The water system must report previously collected monitoring results and certify that the reported monitoring results include all compliance and non-compliance results generated during the time period beginning with the first reported result and ending with the most recent R309-210-8 results.

(II) The water system must certify that the samples were representative of the entire distribution system and that treatment, and distribution system have not changed significantly since the samples were collected.

(III) The study monitoring plan must include a schematic of the distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed or planned system specific study monitoring.

(IV) The water system specific study plan must specify the population served and system type (surface water or ground water).

(V) The water system must retain a complete copy of the system specific study plan submitted under this paragraph (a)(i), including any Director modification of the system specific study plan, for as long as the water system is required to retain the IDSE report under paragraph (b)(v) of this section.

(VI) If the water system submits previously collected data that fully meet the number of samples required under paragraph (a)(i)(A)(II) of this section and the Director rejects some of the data, the water system must either conduct additional monitoring to replace rejected data on a schedule the Director approves or conduct standard monitoring under R309-210-9(2).

(ii) Modeling. The water system may comply through analysis of an extended period simulation hydraulic model. The extended period simulation hydraulic model and analysis must meet the criteria in this paragraph (a)(ii).

(A) Minimum requirements.

(I) The model must simulate 24 hour variation in demand and show a consistently repeating 24 hour pattern of residence time.

(II) The model must represent the criteria listed in paragraphs (a)(ii)(A)(II)(aa) through (ii) of this section.

(aa) 75% of pipe volume;

(bb) 50% of pipe length;

(cc) All pressure zones;

(dd) All 12-inch diameter and larger pipes;

(ee) All 8-inch and larger pipes that connect pressure zones, influence zones from different sources, storage facilities, major demand areas, pumps, and control valves, or are known or expected to be significant conveyors of water;

(ff) All 6-inch and larger pipes that connect remote areas of a distribution system to the main portion of the system;

(gg) All storage facilities with standard operations represented in the model; and

(hh) All active pump stations with controls represented in the model; and

(ii) All active control valves.

(III) The model must be calibrated, or have calibration plans, for the current configuration of the distribution system during the period of high TTHM formation potential. All storage facilities must be evaluated as part of the calibration process. All required calibration must be completed no later than 12 months after plan submission.

(B) Reporting modeling. The system specific study plan must include the information in this paragraph (a)(ii)(B).

(I) Tabular or spreadsheet data demonstrating that the model meets requirements in paragraph (a)(ii)(A)(II) of this section.

(II) A description of all calibration activities undertaken, and if calibration is complete, a graph of predicted tank levels versus measured tank levels for the storage facility with the highest residence time in each pressure zone, and a time series graph of the residence time at the longest residence time storage facility in the distribution system showing the predictions for the entire simulation period (i.e., from time zero until the time it takes to for the model to reach a consistently repeating pattern of residence time).

(III) Model output showing preliminary 24 hour average residence time predictions throughout the distribution system.

(IV) Timing and number of samples representative of the distribution system planned for at least one monitoring period of TTHM and HAA5 dual sample monitoring at a number of locations no less than would be required for the system under standard monitoring in R309-210-9(2) during the historical month of high TTHM. These samples must be taken at locations other than existing R309-210-8 compliance monitoring locations.

(V) Description of how all requirements will be completed no later than 12 months after the water system submits the system specific study plan.

(VI) Schematic of the distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed system specific study monitoring (if calibration is complete) and all R309-210-8 compliance monitoring.

(VII) Population served and system type (surface water or ground water).

(VIII) The water system must retain a complete copy of the system specific study plan submitted under this paragraph (a)(ii), including any Director modification of the system specific study plan, for as long as the water system is

required to retain the IDSE report under paragraph (b)(vii) of this section.

(C) If the water system submits a model that does not fully meet the requirements under paragraph (a)(ii) of this section, the water system must correct the deficiencies and respond to Director inquiries concerning the model. If the water system fails to correct deficiencies or respond to inquiries to the Director's satisfaction, the water system must conduct standard monitoring under R309-210-9(2).

(b) IDSE report. The IDSE report must include the elements required in paragraphs (b)(i) through (b)(vi) of this section. The water system must submit the IDSE report according to the schedule in R309-210-9(1)(c).

(i) The IDSE report must include all TTHM and HAA5 analytical results from R309-210-8 compliance monitoring and all system specific study monitoring conducted during the period of the system specific study presented in a tabular or spreadsheet format acceptable to the Director. If changed from the system specific study plan submitted under paragraph (a) of this section, the IDSE report must also include a schematic of the distribution system, the population served, and system type (surface water or ground water).

(ii) If the water system used the modeling provision under paragraph (a)(ii) of this section, the water system must include final information for the elements described in paragraph (a)(ii)(B) of this section, and a 24-hour time series graph of residence time for each R309-210-10 compliance monitoring location selected.

(iii) The water system must recommend and justify R309-210-10 compliance monitoring locations and timing based on the protocol in R309-210-9(6).

(iv) The IDSE report must include an explanation of any deviations from the approved system specific study plan.

(v) The IDSE report must include the basis (analytical and modeling results) and justification the water system used to select the recommended R309-210-10 monitoring locations.

(vi) The water system may submit the IDSE report in lieu of the system specific study plan on the schedule identified in R309-210-9(1) (c) for submission of the system specific study plan if the water system believes that it has the necessary information by the time that the system specific study plan is due. If the water system elects this approach, the IDSE report must also include all information required under paragraph (a) of this section.

(vii) The water system must retain a complete copy of the IDSE report submitted under this section for 10 years after the date the water system submitted the IDSE report. If the Director modifies the R309-210-10 monitoring requirements the water system recommended in the IDSE report or if the Director approves alternative monitoring locations, the water system must keep a copy of the Director's notification on file for 10 years after the date of the Director's notification. The water system must make the IDSE report and any Director notification available for review by the Director or the public.

(4) 40/30 certification.

(a) Eligibility. The water system is eligible for 40/ 30 certification if it had no TTHM or HAA5 monitoring violations under R309-210-8 of this part and no individual sample exceeded 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 during an eight consecutive calendar quarter period beginning no earlier than the date specified in this paragraph (a).

(i) If the 40/30 certification is due October 1, 2006 then the eligibility for 40/30 certification is based on eight consecutive calendar quarters of R309-210-8 compliance monitoring results beginning no earlier than January 2004.

(ii) If the 40/30 certification is due April 1, 2007 then the eligibility for 40/30 certification is based on eight consecutive calendar quarters of R309-210-8 compliance monitoring results beginning no earlier than January 2004.

(iii) If the 40/30 certification is due October 1, 2007 then the eligibility for 40/30 certification is based on eight consecutive calendar quarters of R309-210-8 compliance monitoring results beginning no earlier than January 2005.

(iv) If the 40/30 certification is due April 1, 2008 then the eligibility for 40/30 certification is based on eight consecutive calendar quarters of R309-210-8 compliance monitoring results beginning no earlier than January 2005.

(v) Unless the water system is on reduced monitoring under R309-210-8 of this part and were not required to monitor during the specified period. If the water system did not monitor during the specified period, the water system must base its eligibility on compliance samples taken during the 12 months preceding the specified period.

(b) 40/30 certification.

(i) The water system must certify to the Director that every individual compliance sample taken under R309-210-8 of this part during the periods

specified in paragraph (a) of this section were less than or equal to 0.040 mg/L for TTHM and less than or equal to 0.030 mg/L for HAA5, and that the water system did not have any TTHM or HAA5 monitoring violations during the period specified in paragraph (a) of this section.

(ii) The Director may require the water system to submit compliance monitoring results, distribution system schematics, and/or recommended R309-210-10 compliance monitoring locations in addition to the certification. If the water system fails to submit the requested information, the Director may require standard monitoring under R309-210-9(2) or a system specific study under R309-210-9(3).

(iii) The Director may still require standard monitoring under R309-210-9(2) or a system specific study under R309-210-9(3) even if the water system meets the criteria in paragraph (a) of this section.

(iv) A water system must retain a complete copy of its certification submitted under this section for 10 years after the date that the water system submitted the certification. The water system must make the certification, all data upon which the certification is based, and any Director notification available for review by the Director or the public.

(5) Very small system waivers.

(a) If the water system serves fewer than 500 people and it has taken TTHM and HAA5 samples under R309-210-8, the water system is not required to comply with this subpart unless the Director notifies the water system that it must conduct standard monitoring under R309-210-9(2) or a system specific study under R309-210-9(3).

(b) If the water system has not taken TTHM and HAA5 samples under R309-210-8 or if the Director notifies the water system that the water system must comply with this subpart, the water system must conduct standard monitoring under R309-210-9(2) or a system specific study under R309-210-9(3).

(6) Stage 2 (R309-210-10) compliance monitoring location recommendations.

(a) The IDSE report must include the recommendations and justification for where and during what month(s) TTHM and HAA5 monitoring for R309-210-10 of this part should be conducted. The water system must base the recommendations on the criteria in paragraphs (b) through (e) of this section.

(b) The water system must select the number of monitoring locations specified in this paragraph (b). The water system will use these recommended locations as R309-210-10 routine compliance monitoring locations, unless Director requires different or additional locations. The water system should distribute locations throughout the distribution system to the extent possible.

(i) Surface water systems serving less than 500.

(A) One monitoring period per year. Two dual samples sets must be collected per monitoring period.

(B) One dual sample set must be taken at the high TTHM location in the distribution system.

(C) One dual sample set must be taken at the high HAA5 location in the distribution system.

(ii) Surface water systems serving between 500 to 3,300.

(A) Four monitoring periods per year, dual sample sets must be taken every 90 days. Two dual samples sets must be collected per monitoring period.

(B) One dual sample set must be taken at the high TTHM location in the distribution system.

(C) One dual sample set must be taken at the high HAA5 location in the distribution system.

(iii) Surface water systems serving between 3,301 to 9,999 population.

(A) Four monitoring periods per year, dual sample sets must be taken every 90 days. Two dual samples sets must be collected per monitoring period.

(B) One dual sample set must be taken at the high TTHM locations in the distribution system.

(C) One dual sample set must be taken at the high HAA5 location in the distribution system.

(iv) Surface water systems serving between 10,000 to 49,999 population.

(A) Four monitoring periods per year, dual sample sets must be taken every 90 days. Four dual samples sets must be collected per monitoring period.

(B) Two dual sample sets must be taken at the high TTHM locations in the distribution system.

(C) One dual sample set must be taken at the high HAA5 locations in the distribution system.

(D) One dual sample set must be taken at an existing R309-210-8 compliance location.

(v) Surface water systems serving between 50,000 to 249,999 population.

(A) Four monitoring periods per year, dual sample sets must be taken every 90 days. Eight dual samples sets must be collected per monitoring period.

(B) Three dual sample sets must be taken at the high TTHM locations in the distribution system.

(C) Three dual sample sets must be taken at the high HAA5 locations in the distribution system.

(D) Two dual samples sets must be taken at an existing R309-210-8 compliance location.

(vi) Surface water systems serving between 250,000 to 999,999 population.

(A) Four monitoring periods per year, dual sample sets must be taken every 90 days. 12 dual samples sets must be collected per monitoring period.

(B) Five dual sample sets must be taken at the high TTHM locations in the distribution system.

(C) Four dual sample sets must be taken at the high HAA5 locations in the distribution system.

(D) Three dual sample sets must be taken at an existing R309-210-8 compliance location.

(vii) Surface water systems serving between 1,000,000 to 4,999,999 population.

(A) Four monitoring periods per year, dual sample sets must be taken every 90 days. 16 dual samples sets must be collected per monitoring period.

(B) Six dual sample sets must be taken at the high TTHM locations in the distribution system.

(C) Six dual sample sets must be taken at the high HAA5 locations in the distribution system.

(D) Four dual sample sets must be taken at an existing R309-210-8 compliance location.

(viii) Surface water systems serving 5,000,000 or more population.

(A) Four monitoring periods per year, dual sample sets must be taken every 90 days. 20 dual samples sets must be collected per monitoring period.

(B) Eight dual sample sets must be taken at the high TTHM locations in the distribution system.

(C) Seven dual sample sets must be taken at the high HAA5 locations in the distribution system.

(D) Five dual sample sets must be taken at an existing R309-210-8 compliance location.

(ix) Ground water systems serving less than 500.

(A) One monitoring period per year. Two dual samples sets must be collected per monitoring period.

(B) One dual sample set must be taken at the high TTHM location in the distribution system.

(C) One dual sample set must be taken at the high HAA5 location in the distribution system.

(x) Ground water systems serving between 500 to 9,999 population.

(A) One monitoring period per year. Two dual samples sets must be collected per monitoring period.

(B) One dual sample set must be taken at the high TTHM location in the distribution system.

(C) One dual sample set must be taken at the high HAA5 location in the distribution system.

(xi) Ground water systems serving between 10,000 to 99,999 population.

(A) Four monitoring periods per year, dual sample sets must be taken every 90 days. Four dual samples sets must be collected per monitoring period.

(B) Two dual sample sets must be taken at the high TTHM locations in the distribution system.

(C) One dual sample set must be taken at the high HAA5 locations in the distribution system.

(D) One dual sample set must be taken at an existing R309-210-8 compliance location.

(xii) Ground water systems serving between 100,000 to 499,999 population.

(A) Four monitoring periods per year, dual sample sets must be taken every 90 days. Six dual samples sets must be collected per monitoring period.

(B) Three dual sample sets must be taken at the high TTHM locations in the distribution system.

(C) Two dual sample sets must be taken at the high HAA5 locations in the distribution system.

(D) One dual sample set must be taken at an existing R309-210-8 compliance location.

(xiii) Ground water systems serving 500,000 or greater population.

(A) Four monitoring periods per year, dual sample sets must be taken every 90 days. Eight dual samples sets must be collected per monitoring period.

(B) Three dual sample sets must be taken at the high TTHM locations in the distribution system.

(C) Three dual sample sets must be taken at the high HAA5 locations in the distribution system.

(D) Two dual sample sets must be taken at an existing R309-210-8 compliance location.

(xiv) All systems must monitor during month of highest DBP concentrations.

(xv) Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for subpart H systems serving 500-3,300. Systems on annual monitoring and subpart H systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. Only one location with a dual sample set per monitoring period is needed if highest TTHM and HAA5 concentrations occur at the same location, and month, if monitored annually).

(c) The water system must recommend R309-210-10 compliance monitoring locations based on standard monitoring results, system specific study results, and R309-210-8 compliance monitoring results. The water system must follow the protocol in paragraphs (c)(i) through (c)(viii) of this section. If required to monitor at more than eight locations, the water system must repeat the protocol as necessary. If the water system do not have existing R309-210-8 compliance monitoring results or if the water system do not have enough existing R309-210-8 compliance monitoring results, the water system must repeat the protocol, skipping the provisions of paragraphs (c)(iii) and (c)(vii) of this section as necessary, until the water system have identified the required total number of monitoring locations.

(i) Location with the highest TTHM LRAA not previously selected as a R309-210-10 monitoring location.

(ii) Location with the highest HAA5 LRAA not previously selected as a R309-210-10 monitoring location.

(iii) Existing R309-210-8 average residence time compliance monitoring location (maximum residence time compliance monitoring location for ground water systems) with the highest HAA5 LRAA not previously selected as a R309-210-10 monitoring location.

(iv) Location with the highest TTHM LRAA not previously selected as a R309-210-10 monitoring location.

(v) Location with the highest TTHM LRAA not previously selected as a R309-210-10 monitoring location.

(vi) Location with the highest HAA5 LRAA not previously selected as a R309-210-10 monitoring location.

(vii) Existing R309-210-8 average residence time compliance monitoring location (maximum residence time compliance monitoring location for ground water systems) with the highest TTHM LRAA not previously selected as a R309-210-10 monitoring location.

(viii) Location with the highest HAA5 LRAA not previously selected as a R309-210-10 monitoring location.

(d) The water system may recommend locations other than those specified in paragraph (c) of this section if the water system include a rationale for selecting other locations. If the Director approves the alternate locations, the water system must monitor at these locations to determine compliance under R309-210-10 of this part.

(e) The recommended schedule must include R309-210-10 monitoring during the peak historical month for TTHM and HAA5 concentration, unless the Director approves another month. Once the water system have identified the peak historical month, and if the water system is required to conduct routine monitoring at least quarterly, the water system must schedule R309-210-10 compliance monitoring at a regular frequency of every 90 days or fewer.

R309-210-10. Disinfection Byproducts - Stage 2 Requirements.

(1) General requirements.

(a) General. The regulations in this sub-section establish monitoring and other requirements for achieving compliance with maximum contaminant levels based on locational running annual averages (LRAA) for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5), and for achieving compliance with maximum residual disinfectant residuals for chlorine and chloramine for certain consecutive systems.

(b) Applicability. The water system is subject to these requirements if the system is a community water system or a non-transient non-community water system that uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.

(c) Schedule. The water system must comply with the requirements in this subpart on the schedule in the following sub-paragraphs (c)(i) through (vi) based on the system type.

(i) For water systems that are not part of a combined distribution system and systems that serve the largest population in the combined distribution system.

(A) For water systems that serve a population greater than or equal to 100,000 the water system must comply with R309-210-10 monitoring by April 1, 2012.

(B) For water systems that serve a population from 50,000 to 99,999 the water system must comply with R309-210-10 monitoring by October 1, 2012.

(C) For water systems that serve a population from 10,000 to 49,999 the water system must comply with R309-210-10 monitoring by October 1, 2013.

(D) For water systems that serve a population less than 10,000 the water system must comply with R309-210-10 monitoring by October 1, 2013 if no Cryptosporidium monitoring is required under R309-215-15(2)(a)(iv) or October 1, 2014 if Cryptosporidium monitoring is required under R309-215-15(a)(iv) or (a)(vi).

(ii) For other water systems that are part of a combined distribution system:

(A) For wholesale systems or consecutive systems the water system must comply with R309-210-10 monitoring at the same time as the system with the earliest compliance date in the combined distribution system.

(iii) The Director may grant up to an additional 24 months for compliance with MCLs and operational evaluation levels if the water system requires capital improvements to comply with an MCL.

(iv) The monitoring frequency is specified in R309-210-10(2)(a)(ii).

(A) If the water system is required to conduct quarterly monitoring, the water system must begin monitoring in the first full calendar quarter that includes the compliance date in paragraph (c).

(B) If the water system is required to conduct monitoring at a frequency that is less than quarterly, the water system must begin monitoring in the calendar month recommended in the IDSE report prepared under R309-210-9(2) or R309-210-9(3) or the calendar month identified in the R309-210-10 monitoring plan developed under R309-210-10(3) no later than 12 months after the compliance date in R309-210-10(1)(c).

(v) If the water system is required to conduct quarterly monitoring, the water system must make compliance calculations at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter (or earlier if the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters). If the water system is required to conduct

monitoring at a frequency that is less than quarterly, the water system must make compliance calculations beginning with the first compliance sample taken after the compliance date.

(vi) For the purpose of the schedule in this paragraph (c), the Director may determine that the combined distribution system does not include certain consecutive systems based on factors such as receiving water from a wholesale system only on an emergency basis or receiving only a small percentage and small volume of water from a wholesale system. The Director may also determine that the combined distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.

(d) Monitoring and compliance.

(i) Systems required to monitor quarterly. To comply with R309-210-10 MCLs in R309-200-5(3)(c)(3)(vi), the water system must calculate LRAAs for TTHM and HAA5 using monitoring results collected under this sub-section and determine that each LRAA does not exceed the MCL. If the water system fails to complete four consecutive quarters of monitoring, the water system must calculate compliance with the MCL based on the average of the available data from the most recent four quarters. If the water system takes more than one sample per quarter at a monitoring location, the water system must average all samples taken in the quarter at that location to determine a quarterly average to be used in the LRAA calculation.

(ii) Systems required to monitor yearly or less frequently. To determine compliance with R309-210-10 MCLs in R309-200-5(3)(c)(3)(vi), the water system must determine that each sample taken is less than the MCL. If any sample exceeds the MCL, the water system must comply with the requirements of R309-210-10(6). If no sample exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

(e) Violation. The water system is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if the water system fail to monitor.

(2) Routine monitoring.

(a) Monitoring.

(i) If the water system submitted an IDSE report, the water system must begin monitoring at the locations and months the water system have

recommended in the IDSE report submitted under R309-210-9(6) following the schedule in R309-210-10(1)(c), unless the Director requires other locations or additional locations after its review. If the water system submitted a 40/30 certification under R309-210-9(4) or the water system qualified for a very small system waiver under R309-210-9(5) or the water system is a non-transient non-community water system serving less than 10,000, the water system must monitor at the location(s) and dates identified in the monitoring plan in R309-210-8(5), updated as required by R309-210-10(3).

(ii) The water system must monitor at no fewer than the number of locations identified in this paragraph (a)(ii).

(A) Surface water systems serving less than 500 shall have one monitoring period per year and shall collect two dual samples sets per monitoring period.

(B) Surface water systems serving between 500 to 3,300 shall have four monitoring periods per year and shall collect two dual samples sets per monitoring period.

(C) Surface water systems serving between 3,301 to 9,999 population shall have four monitoring periods per year and shall collect two dual samples sets per monitoring period.

(D) Surface water systems serving between 10,000 to 49,999 population shall have four monitoring periods per year and shall collect four dual samples sets per monitoring period.

(E) Surface water systems serving between 50,000 to 249,999 population shall have four monitoring periods per year and shall collect eight dual samples sets per monitoring period.

(F) Surface water systems serving between 250,000 to 999,999 population shall have four monitoring periods per year and shall collect 12 dual samples per monitoring period.

(G) Surface water systems serving between 1,000,000 to 4,999,999 population shall have four monitoring periods per year and shall collect 16 dual samples sets per monitoring period.

(H) Surface water systems serving 5,000,000 or more population shall have four monitoring periods per year and shall collect 20 dual samples sets per monitoring period.

(I) Ground water systems serving less than 500 shall have one monitoring period per year and shall collect two dual samples sets per monitoring period.

(J) Ground water systems serving between 500 to 9,999 population shall have one monitoring period per year and shall collect two dual samples sets per monitoring period.

(K) Ground water systems serving between 10,000 to 99,999 population shall have four monitoring periods per year and shall collect four dual samples sets per monitoring period.

(L) Ground water systems serving between 100,000 to 499,999 population shall have four monitoring periods per year and shall collect six dual samples sets per monitoring period.

(M) Ground water systems serving 500,000 or greater population shall have four monitoring periods per year and shall collect eight dual samples sets per monitoring period.

(N) All systems must monitor during month of highest DBP concentrations.

(O) Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for surface water systems serving 500-3,300. Systems on annual monitoring and surface water systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. Only one location with a dual sample set per monitoring period is needed if highest TTHM and HAA5 concentrations occur at the same location (and month, if monitored annually).

(iii) If the water system is an undisinfected system that begins using a disinfectant other than UV light after the dates in R309-210-9 for complying with the Initial Distribution System Evaluation requirements, the water system must consult with the Director to identify compliance monitoring locations for this sub-section. The water system must then develop a monitoring plan under R309-210-10(3) that includes those monitoring locations.

(b) Analytical methods. The water system must use an approved method listed in R309-200-4(3) for TTHM and HAA5 analyses in this sub-section. Analyses must be conducted by laboratories that have received certification by EPA or the Director as specified in R309-200-4(3).

(3) Stage 2 monitoring plan.

(a) (i) The water system must develop and implement a monitoring plan to be kept on file for Director and public review. The monitoring plan must contain the elements in paragraphs (a)(i)(A) through (a)(i)(D) of this section and be complete no later than the date the water system conduct the initial monitoring under this sub-section.

(A) Monitoring locations;

(B) Monitoring dates;

(C) Compliance calculation procedures; and

(D) Monitoring plans for any other systems in the combined distribution system if the Director has reduced monitoring requirements under the Director authority in R309-105-5(2).

(ii) If the water system were not required to submit an IDSE report under either R309-210-9(2) or R309-210-9(3), and the water system do not have sufficient R309-210-8 monitoring locations to identify the required number of R309-210-10 compliance monitoring locations indicated in R309-210-9(6)(b), the water system must identify additional locations by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of compliance monitoring locations have been identified. The water system must also provide the rationale for identifying the locations as having high levels of TTHM or HAA5. If the water system have more R309-210-8 monitoring locations than required for R309-210-10 compliance monitoring in R309-210-9(6)(b), the water system must identify which locations the water system will use for R309-210-10 compliance monitoring by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of R309-210-10 compliance monitoring locations have been identified.

(b) If the water system is a surface water system serving greater than 3,300 people, the water system must submit a copy of the monitoring plan to the Director prior to the date the water system conduct the initial monitoring under this sub-section, unless the IDSE report submitted under R309-210-9 contains all the information required by this section.

(c) The water system may revise the monitoring plan to reflect changes in treatment, distribution system operations and layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, or for Director-approved reasons, after consultation with the Director regarding the need for changes and the appropriateness of changes. If the water system changes monitoring locations, the water system must replace existing compliance monitoring locations with the lowest

LRAA with new locations that reflect the current distribution system locations with expected high TTHM or HAA5 levels. The Director may also require modifications in the monitoring plan. If the water system is a surface water system serving greater than 3,300 people, the water system must submit a copy of the modified monitoring plan to the Director prior to the date the water system is required to comply with the revised monitoring plan.

(4) Reduced monitoring.

(a) The water system may reduce monitoring to the level specified in this paragraph (a) any time the LRAA is equal to or less than 0.040 mg/L for TTHM and equal to or less than 0.030 mg/L for HAA5 at all monitoring locations. The water system may only use data collected under the provisions of this sub-section or R309-210-8 to qualify for reduced monitoring. In addition, the source water annual average TOC level, before any treatment, must be less than or equal to 4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either R309-210-8(2)(a)(iii) or R309-215-12.

(i) Surface water systems serving a population less than 500. Monitoring reduction

(A) Monitoring may not be reduced.

(ii) Surface water systems serving between 500 to 3,300 population.

(A) One monitoring periods per year. 1 TTHM and 1 HAA5 sample must be collected per monitoring period.

(B) One sample at the location and during the quarter with the highest TTHM single measurement in the distribution system.

(C) One sample at the location and during the quarter with the highest HAA5 single measurement in the distribution system.

(D) Only one dual sample set per year is required if the highest TTHM and HAA5 measurements occurred at the same location and quarter.

(iii) Surface water systems serving between 3,301 to 9,999 population.

(A) One monitoring period per year. Two dual samples sets must be collected per monitoring period.

(B) One dual sample set at the location and during the quarter with the highest TTHM single measurement in the distribution system.

(C) One dual sample set at the location and during the quarter with the highest HAA5 single measurement in the distribution system.

(iv) Surface water systems serving between 10,000 to 49,999 population.

(A) Four monitoring periods per year. Two dual samples sets must be collected per monitoring period.

(B) One dual sample set must be taken at the location of the highest TTHM LRAAs.

(C) One dual sample set must be taken at the location of the highest HAA5 LRAAs.

(v) Surface water systems serving between 50,000 to 249,999 population.

(A) Four monitoring periods per year. Four dual samples sets must be collected per monitoring period.

(B) A dual sample set must be taken at each of the locations of the two highest TTHM LRAAs.

(C) A dual sample set must be taken at each of the locations of the two highest HAA5 LRAAs.

(vi) Surface water systems serving between 250,000 to 999,999 population.

(A) Four monitoring periods per year. Six dual samples sets must be collected per monitoring period.

(B) A dual sample set must be taken at each of the locations of the three highest TTHM LRAAs.

(C) A dual sample set must be taken at each of the locations of the three highest HAA5 LRAAs.

(vii) Surface water systems serving between 1,000,000 to 4,999,999 population.

(A) Four monitoring periods per year. Eight dual samples sets must be collected per monitoring period.

(B) A dual sample set must be taken at each of the locations of the four highest TTHM LRAAs.

(C) A dual sample set must be taken at each of the locations of the four highest HAA5 LRAAs.

(viii) Surface water systems serving 5,000,000 or more population.

(A) Four monitoring periods per year. 10 dual samples sets must be collected per monitoring period.

(B) A dual sample set must be taken at each of the locations of the five highest TTHM LRAAs.

(C) A dual sample set must be taken at each of the locations of the five highest HAA5 LRAAs.

(ix) Ground water systems serving less than 500.

(A) One monitoring period every three years. 1 TTHM and 1 HAA5 sample must be collected per monitoring period.

(B) One sample at the location and during the quarter with the highest TTHM single measurement in the distribution system.

(C) One sample at the location and during the quarter with the highest HAA5 single measurement in the distribution system.

(D) Only one dual sample set per year is required if the highest TTHM and HAA5 measurements occurred at the same location and quarter.

(x) Ground water systems serving between 500 to 9,999 population.

(A) One monitoring period per year. 1 TTHM and 1 HAA5 sample must be collected per monitoring period.

(B) One sample at the location and during the quarter with the highest TTHM single measurement in the distribution system.

(C) One sample at the location and during the quarter with the highest HAA5 single measurement in the distribution system.

(D) Only one dual sample set per year is required if the highest TTHM and HAA5 measurements occurred at the same location and quarter.

(xi) Ground water systems serving between 10,000 to 99,999 population.

(A) One monitoring period per year. Two dual samples sets must be collected per monitoring period.

(B) One dual sample set at the location and during the quarter with the highest TTHM single measurement in the distribution system.

(C) One dual sample set at the location and during the quarter with the highest HAA5 single measurement in the distribution system.

(xii) Ground water systems serving between 100,000 to 499,999 population.

(A) Four monitoring periods per year. Two dual samples sets must be collected per monitoring period.

(B) One dual sample set must be taken at the location of the highest TTHM LRAAs.

(C) One dual sample set must be taken at the location of the highest HAA5 LRAAs.

(xiii) Ground water systems serving 500,000 or greater population.

(A) Four monitoring periods per year. Four dual samples sets must be collected per monitoring period.

(B) A dual sample set must be taken at each of the locations of the two highest TTHM LRAAs.

(C) A dual sample set must be taken at each of the locations of the two highest HAA5 LRAAs.

(xiv) Systems on quarterly monitoring must take dual sample sets every 90 days.

(b) The water system may remain on reduced monitoring as long as the TTHM LRAA less than or equal to 0.040 mg/L and the HAA5 LRAA less than or equal to 0.030 mg/L at each monitoring location (for systems with quarterly reduced monitoring) or each TTHM sample less than or equal to 0.060 mg/L and each HAA5 sample less than or equal to 0.045 mg/L (for systems with annual or less frequent monitoring). In addition, the source water annual average TOC level, before any treatment, must be less than or equal to 4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either R309-210-8(2)(a)(iii) or R309-215-12.

(c) If the LRAA based on quarterly monitoring at any monitoring location exceeds either 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 or if the annual (or less frequent) sample at any location exceeds either 0.060 mg/L for TTHM or 0.045 mg/L for HAA5, or if the source water annual average TOC level, before any treatment, is greater than 4.0 mg/L at any treatment plant treating surface water or ground water under the direct influence of surface water, the water system must resume routine monitoring under R309-210-10(2) or begin increased monitoring if R309-210-10(6) applies.

(d) The Director may return the system to routine monitoring at the Director's discretion.

(5) Additional requirements for consecutive systems.

If the water system is a consecutive system that does not add a disinfectant but delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light, the water system must comply with analytical and monitoring requirements for chlorine and chloramines in R309-200-4(3) and the compliance requirements in R309-210-8(6)(c)(i) beginning April 1, 2009, unless required earlier by the Director, and report monitoring results under R309-105-16(2)(c).

(6) Conditions requiring increased monitoring.

(a) If the water system is required to monitor at a particular location annually or less frequently than annually under R309-210-10(2) or R309-210-10(4), the water system must increase monitoring to dual sample sets once per quarter (taken every 90 days) at all locations if a TTHM sample is greater than 0.080 mg/L or a HAA5 sample is greater than 0.06 mg/L at any location.

(b) The water system is in violation of the MCL when the LRAA exceeds the R309-210-10 MCLs in R309-200-5(3)(c)(vi), calculated based on four consecutive quarters of monitoring (or the LRAA calculated based on fewer than four quarters of data if the MCL would be exceeded regardless of the monitoring results of subsequent quarters). The water system is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if the water system fail to monitor.

(c) The water system may return to routine monitoring once the water system have conducted increased monitoring for at least four consecutive quarters and the LRAA for every monitoring location is less than or equal to 0.060 mg/L for TTHM and less than or equal to 0.045 mg/L for HAA5.

(7) Operational evaluation levels.

(a) The water system have exceeded the operational evaluation level at any monitoring location where the sum of the two previous quarters' TTHM results plus twice the current quarter's TTHM result, divided by 4 to determine an average, exceeds 0.080 mg/L, or where the sum of the two previous quarters' HAA5 results plus twice the current quarter's HAA5 result, divided by 4 to determine an average, exceeds 0.060 mg/L.

(b) (i) If the water system exceeds the operational evaluation level, the water system must conduct an operational evaluation and submit a written report of the evaluation to the Director no later than 90 days after being notified of the analytical result that causes the water system to exceed the operational evaluation level. The written report must be made available to the public upon request.

(ii) The operational evaluation must include an examination of system treatment and distribution operational practices, including storage tank operations, excess storage capacity, distribution system flushing, changes in sources or source water quality, and treatment changes or problems that may contribute to TTHM and HAA5 formation and what steps could be considered to minimize future exceedences.

(A) The water system may request and the Director may allow the water system to limit the scope of the evaluation if the water system is able to identify the cause of the operational evaluation level exceedance.

(B) The request to limit the scope of the evaluation does not extend the schedule in paragraph (b)(i) of this section for submitting the written report. The Director must approve this limited scope of evaluation in writing and the water system must keep that approval with the completed report.

(8) Requirements for remaining on reduced TTHM and HAA5 monitoring based on R309-210-8 results.

The water system may remain on reduced monitoring after the dates identified in R309-210-10(1)(c) for compliance with this sub-section only if the water system qualifies for a 40/30 certification under R309-210-9(4) or have received a very small system waiver under R309-210-9(5), plus the water system meets the reduced monitoring criteria in R309-210-10(4)(a), and the water system does not change or add monitoring locations from those used for compliance monitoring under R309-210-8. If the monitoring locations under this sub-section differ from the monitoring locations under R309-210-8, the water system may not

remain on reduced monitoring after the dates identified in R309-210-10(1)(c) for compliance with this sub-section.

(9) Requirements for remaining on increased TTHM and HAA5 monitoring based on R309-210-8 results.

If the water system was on increased monitoring under R309-210-8(2)(a), the water system must remain on increased monitoring until the water system qualifies for a return to routine monitoring under R309-210-10(6)(c). The water system must conduct increased monitoring under R309-210-10(6) at the monitoring locations in the monitoring plan developed under R309-210-10(3) beginning at the date identified in R309-210-10(1)(c) for compliance with this sub-section and remain on increased monitoring until the water system qualifies for a return to routine monitoring under R309-210-10(6)(c).

(10) Reporting and recordkeeping requirements.

(a) Reporting.

(i) The water system must report the following information for each monitoring location to the Director within 10 days of the end of any quarter in which monitoring is required:

(A) Number of samples taken during the last quarter.

(B) Date and results of each sample taken during the last quarter.

(C) Arithmetic average of quarterly results for the last four quarters for each monitoring location (LRAA), beginning at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter. If the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters, the water system must report this information to the Director as part of the first report due following the compliance date or anytime thereafter that this determination is made. If the water system is required to conduct monitoring at a frequency that is less than quarterly, the water system must make compliance calculations beginning with the first compliance sample taken after the compliance date, unless the water system is required to conduct increased monitoring under R309-210-10(6).

(D) Whether, based on R309-200-5(3)(c)(vi) and this sub-section, the MCL was violated at any monitoring location.

(E) Any operational evaluation levels that were exceeded during the quarter and, if so, the location and date, and the calculated TTHM and HAA5 levels.

(ii) If the system is a surface water system seeking to qualify for or remain on reduced TTHM/HAA5 monitoring, the water system must report the following source water TOC information for each treatment plant that treats surface water or ground water under the direct influence of surface water to the Director within 10 days of the end of any quarter in which monitoring is required:

(A) The number of source water TOC samples taken each month during last quarter.

(B) The date and result of each sample taken during last quarter.

(C) The quarterly average of monthly samples taken during last quarter or the result of the quarterly sample.

(D) The running annual average (RAA) of quarterly averages from the past four quarters.

(E) Whether the RAA exceeded 4.0 mg/L.

(iii) The Director may choose to perform calculations and determine whether the MCL was exceeded or the system is eligible for reduced monitoring in lieu of having the system report that information.

(b) Recordkeeping. The water system must retain any R309-210-10 monitoring plans and the R309-210-10 monitoring results as required by R309-105-17.

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R309-215. Monitoring and Water Quality: Treatment Plant Monitoring Requirements.

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R309-215. Monitoring and Water Quality: Treatment Plant Monitoring Requirements.

R309-215-1. Purpose.

The purpose of this rule is to outline the monitoring and reporting requirements for public water systems which treat water prior to providing it for human consumption.

R309-215-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104 of the Utah Code and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-215-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-215-4. General.

(1) All public water systems are required to monitor their water to determine if they comply with the requirements for water quality stated in R309-200. In exceptional circumstances the Director may modify the monitoring requirements given herein as is deemed appropriate.

(2) The Director may determine compliance or initiate compliance actions based upon analytical results and other information compiled by authorized representatives.

(3) If the water fails to meet minimum standards, then certain public notification procedures shall be carried out, as outlined in R309-220. Water suppliers shall also keep analytical records in their possession, for a required length of time, as outlined in R309-105-17.

(4) All samples shall be taken at representative sites as specified herein for each contaminant or group of contaminants.

(5) For the purpose of determining compliance, samples may only be considered if they have been analyzed by the State of Utah primacy laboratory or a laboratory certified by the Utah State Health Laboratory.

(6) Measurements for pH, temperature, turbidity and disinfectant residual may, under the direction of the direct responsible operator, be performed by any water supplier or their representative.

(7) All samples shall be marked either: routine, repeat, check or investigative before submission of such samples to a certified laboratory. Routine, repeat, and check samples shall be considered compliance purpose samples.

(8) All sample results can be sent to the Division of Drinking Water either electronically or in hard copy form.

(9) Unless otherwise required by the Director, the effective dates on which required monitoring shall be initiated are identical to the dates published in 40 CFR 141 on July 1, 2001 by the Office of the Federal Register

(10) Exemptions from monitoring requirements shall only be granted in accordance with R309-105-5.

R309-215-5. Monitoring Requirements for Groundwater Disinfection.

(1) General: Continuous disinfection is recommended for all drinking water sources. Continuous disinfection shall be required of all groundwater sources which do not consistently meet standards of bacteriologic quality. Once required by the Director continuous disinfection shall not be interrupted nor terminated unless so authorized, in writing, by the Director.

(2) Disinfection Reporting: For each disinfection treatment facility, plant management shall report information to the Division as specified in R309-105-16(2)(c).

(3) A water system shall report a malfunction of any facility or equipment such that a detectable residual cannot be maintained throughout the distribution system. The system shall notify the Division as soon as possible, but no later than by the end of the next business day. The system also shall notify the Division by the end of the next business day whether or not the residual was restored to at least 0.2 mg/L within four hours.

R309-215-6. Monitoring Requirements for Miscellaneous Treatment Plants.

(1) Treatment of the drinking water may be required for other than inactivation of microbial contaminants or removal/inactivation of pathogens and viruses. Miscellaneous treatment methods are outlined in R309-535.

(2) The Director may require additional monitoring as necessary to evaluate the treatment process and to ensure the quality of the water. The specific analytes, frequency of

monitoring, the reporting frequency and the sampling location for which monitoring may be required shall be determined by the following:

(a) the contaminant of concern for which the treatment process has been installed;

(b) the process control samples required to operate treatment process being used; and

(c) alternative surrogate sampling when it is either quicker or less expensive and still provides the necessary information;

(3) For point-of-use or point-of-entry technology the location of sampling may be at each treatment unit spread out over time.

(4) If monitoring is required, the Director shall provide the report forms and the water system shall report the data as required by R309-105-16(3). Alternate forms may be used as long as prior approval from the Director is obtained.

R309-215-7. Surface Water Treatment Evaluations.

(1) General: Surface water sources or groundwater sources under direct influence of surface water shall be disinfected during the course of required surface water treatment. Disinfection shall not be considered a substitute for inadequate collection facilities. All public water systems which use a treatment technique to treat water obtained in whole or in part from surface water sources or ground water sources under the direct influence of surface water shall monitor the plant's operation and report the results to the Division as indicated in R309-215-7 through R309-215-14. Individual plants will be evaluated in accordance with the criteria outlined in paragraph (2) below. Based on information submitted and/or plant inspections, the plant will receive credit for treatment techniques other than disinfection that remove pathogens, specifically Giardia lamblia and viruses. This credit (log removal) will reduce the required disinfectant "CT" value which the plant shall maintain to assure compliance with R309-200-5(7)(a)(i).

(2) Criteria for Individual Treatment Plant Evaluation: New and existing water treatment plants shall meet specified monitoring and performance criteria in order to ensure that filtration and disinfection are satisfactorily practiced. The monitoring requirements and performance criteria for turbidity and disinfection listed above provide the minimum for the Division to evaluate the plant's efficiency in removing and/or inactivating 99.9 percent (3-log) of Giardia lamblia cysts and 99.99 percent (4-log) of viruses as required by R309-505-6(2)(a) and (b).

(3) The Division, upon evaluation of individual raw water sources, surface water or ground water under the direct influence of surface water, may require greater than the 3-log, 4-log removal/inactivation of Giardia and viruses respectfully. If a raw water source exhibits an estimated concentration of 1 to 10 Giardia cysts per 100 liters, 4 and 5-log

removal/inactivation may be required. If the raw water exhibits a concentration of 10 to 100 cysts per 100 liters, 5 and 6-log removal/inactivation may be required.

If a plant decides to recycle any spent filter backwash water, thickener supernatant, or liquids from dewatering processes the Division shall be notified in writing by December 8, 2003 or prior to recycling such waters. Such notification shall include, at a minimum:

(a) A plant schematic showing the origin of all flows which are recycled (including, but not limited to, spent filter backwash water, thickener supernatant, and any liquids from dewatering processes), the hydraulic conveyance used to transport them, and the location where they are reintroduced back into the treatment plant.

(b) Typical recycle flow in gallons per minute (gpm), the highest observed plant flow experienced in the previous year (gpm), design flow for the treatment plant (gpm), and operating capacity approved by the Director for the plant where the Director has made such determinations.

(c) Treatment technique (TT) requirement. Any system that recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes shall return these flows through the processes of a system's existing conventional or direct filtration system as defined in R309-525 or R309-530 or at an alternate location approved by the Director by or after June 8, 2004. If capital improvements are required to modify the recycle location to meet this requirement, all capital improvements must be completed no later than June 8, 2006.

(4) The Director, upon individual plant evaluation, may assign the treatment techniques (coagulation, flocculation, sedimentation and filtration) credit toward removal of Giardia cysts and viruses. The greater the number of barriers in the treatment process, the greater the reduction of pathogens, therefore lessor credit will be given to processes such as direct filtration which eliminate one or more conventional barriers. Plants may monitor turbidity at multiple points in the treatment process as evidence of the performance of an individual treatment technique.

(5) The nominal credit that will be assigned certain conventional processes are outlined in Table 215-1:

TABLE 215-1
CONVENTIONAL PROCESS CREDIT

Process	Log Reduction Credit	
	Giardia	Viruses
Conventional CompleteTreatment	2.5	2.0
Direct Filtration	2.0	1.0
Slow Sand Filtration	2.0	2.0
Diatomaceous Earth	2.0	1.0

(6) Upon evaluation of information provided by individual plants or obtained during inspections by Division staff, the Director may increase or decrease the nominal credit assigned individual plants based on that evaluation.

(a) Items which would augment the treatment process and thereby warrant increased credit are:

(i) facilities or means to moderate extreme fluctuations in raw water characteristics;

(ii) sufficient on-site laboratory facilities regularly used to alert operators to changes in raw water quality;

(iii) use of pilot stream facilities which duplicate treatment conditions but allow operators to know results of adjustments much sooner than if only monitoring plant effluent;

(iv) use of additional monitoring methods such as particle size and distribution analysis to achieve greater efficiency in particulate removal;

(v) regular program for preventive maintenance, records of such, and general good housekeeping; or

(vi) adequate staff of well trained and certified plant operators.

(b) Items which would be considered a detriment to the treatment process and thereby warrant decreased credit are:

(i) inadequate staff of trained and certified operators;

(ii) lack of regular maintenance and poor housekeeping; or

(iii) insufficient on-site laboratory facilities.

R309-215-8. Surface Water Treatment Plant Monitoring and Reporting.

Treatment plant management shall report the following to the Division within ten days after the end of each month that the system serves water to the public, except as otherwise noted:

(1) For each day;

(a) if the plant treats water from multiple sources, the sources being utilized (including recycled backwash water) and the ratio for each if blending occurs.

(b) the total volume of water treated by the plant,

(c) the turbidity of the raw water entering the plant,

(d) the pH of the effluent water, measured at or near the monitoring point for disinfectant residual,

(e) the temperature of the effluent water, measured at or near the monitoring point for disinfectant residual,

(f) the type and amount of chemicals used in the treatment process (clearly indicating the weight and active percent of chemical if dry feeders are used, or the percent solution and volume fed if liquid feeders are used),

(g) the high and low temperature and weather conditions (local forecast information may be used, but any precipitation in the watershed should be further described as light, moderate, heavy, or extremely heavy), and

(h) the results of any "jar tests" conducted that day

(2) For each filter, each day;

(a) the rate of water applied to each (gpm/sq.ft.),

(b) the head loss across each (feet of water or psi),

(c) length of backwash (if conducted; in minutes), and

(d) hours of operation since last backwashed.

(3) Annually;

certify in writing as required by R309-105-14(1) that when a product containing acrylamide and/or epichlorohydrin is used, the combination of the amount of residual monomer in the polymer and the dosage rate does not exceed the levels specified as follows:

(a) Acrylamide: 0.05%, when dosed at 1 part per million, and

(b) Epichlorohydrin: 0.01%, when dosed at 20 parts per million.

Certification may rely on manufacturers data.

(4) Additional record-keeping for plants that recycle.

The system must collect and retain on file recycle flow information for review and evaluation by the Director beginning June 8, 2004 or upon approval for recycling. As a minimum the following shall be maintained:

(a) Copy of the recycle notification and information submitted to the Division under R309-215-7(3).

(b) List of all recycle flows and the frequency with which they are returned.

(c) Average and maximum backwash flow rates through the filters and the average and maximum duration of the filter backwash process in minutes.

(d) Typical filter run length and a written summary of how filter run length is determined.

(e) The type of treatment provided for the recycle flow.

(f) Data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used, average dose, frequency of use and frequency at which solids are removed, if applicable.

R309-215-9. Turbidity Monitoring and Reporting.

Public water systems utilizing surface water and ground water under the direct influence of surface water shall monitor for turbidity in accordance with this section. Small surface water systems serving a population less than 10,000 shall monitor in accordance with subsections (1), (2), (3), (5) and (6). Large surface water systems serving 10,000 or more population shall monitor in accordance with subsections (1), (2), (3), (4) and (6).

(1) Routine Monitoring Requirements for Treatment Facilities utilizing surface water sources or ground water sources under the direct influence of surface water.

(a) All public water systems which use a treatment technique to treat water obtained in whole or in part from surface water sources or ground water sources under the direct influence of surface water shall monitor for turbidity at the treatment plant's clearwell outlet. This monitoring shall be independent of the individual filter monitoring required by R309-525-15(4)(b)(vi) and R309-525-15(4)(c)(vii). Where the plant facility does not have an internal clearwell, the turbidity shall be monitored at the inlet to a finished water reservoir external to the plant provided such reservoir receives only water from the treatment plant and, furthermore, is located before any

point of consumer connection to the water system. If such external reservoir does not exist, turbidity shall then be monitored at a location immediately downstream of the treatment plant filters.

(b) All treatment plants, with the exception of those utilizing slow sand filtration and other conditions indicated in section (c) below, shall be equipped with continuous turbidity monitoring and recording equipment for which the direct responsible charge operator will validate the continuous measurements for accuracy in accordance with paragraph (d) below. These plants shall continuously record the finished water turbidity of the combined filter effluent as well as each individual filter. All systems shall be equipped to continuously monitor the turbidity at each filter unless the treatment plant is only equipped with two filters and the turbidity is measured at the combined filter effluent (CFE). If there is a failure in continuous monitoring equipment the system shall conduct grab sampling every 4 hours in lieu of continuous monitoring, but for no more than five working days following the failure of equipment. Systems serving less than 10,000 population shall have no more than 14 days to conduct grab samples in lieu of continuous monitoring in order to correct any failing equipment. All surface water systems shall monitor the turbidity results of individual filters at a frequency no greater than every 15 minutes.

(c) Turbidity measurements, as outlined below, shall be reported to the Division within ten days after the end of each month that the system serves water to the public. Systems are required to mark and interpret turbidity values from the recorded charts at the end of each four-hour interval of operation (or some shorter regular time interval) to determine compliance with the turbidity performance criterion. For systems using slow sand filtration the Director may reduce the sampling frequency to as little as once per day if the Director determines that less frequent monitoring is sufficient to indicate effective filtration performance. For systems serving 500 or fewer persons, the Director may reduce the turbidity sampling frequency to as little as once per day, regardless of the type of filtration treatment used, if the Director determines that less frequent monitoring is sufficient to indicate effective filtration performance.

The following shall be reported and the required percentage achieved for compliance:

(i) The total number of interpreted filtered water turbidity measurements taken during the month;

(ii) The number and percentage of interpreted filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in R309-200-5(5)(a)(ii) (or increased limit approved by the Director). The percentage of measurements which are less than or equal to the turbidity limit shall be 95 percent or greater for compliance; and

(iii) The date and value of any turbidity measurements taken during the month which exceed 5 NTU. The system shall inform the Division as soon as practical, but no later than 24 hours after the exceedance is known, in accordance with R309-220-6(2)(c) if any turbidity measurements exceed 5 NTU.

(d) The analytical method which shall be followed in making the required determinations shall be Nephelometric Method - Nephelometric Turbidity Unit as set forth in the latest edition of Standard Methods for Examination of Water and Wastewater, 1985, American Public Health Association et al., (Method 214A, pp. 134-136 in the 16th edition). Continuous turbidity monitoring equipment shall be checked for accuracy and recalibrated using methods outlined in the above standard at a minimum frequency of monthly. The direct responsible charge operator will note on the turbidity report form when these recalibrations are conducted. For systems that practice lime softening, the representative combined filter effluent turbidity sample may be acidified prior to analysis with prior approval by the Director as to the protocol.

(2) Procedures if a Filtered Water Turbidity Limit is Exceeded

(a) Resampling -

If an analysis indicates that the turbidity limit has been exceeded, the sampling and measurement shall be confirmed by resampling as soon as practicable and preferably within one hour.

(b) If the result of resampling confirms that the turbidity limit has been exceeded, the system shall collect and have analyzed at least one bacteriologic sample near the first service connection from the source as specified in R309-210-5(1)(f). The system shall collect this bacteriologic sample within 24 hours of the turbidity exceedance. Sample results from this monitoring shall be included in determining bacteriologic compliance for that month.

(c) Initial Notification of the Director -

If the repeat sample confirms that the turbidity limit has been exceeded, the supplier shall report this fact to the Director as soon as practical, but no later than 24 hours after the exceedance is known in accordance with the public notification requirements under R309-220-6(2)(c). This reporting is in addition to reporting the incident on any monthly reports.

(3) For the purpose of individual plant evaluation and establishment of pathogen removal credit

for the purpose of lowering the required "CT" value assigned a plant, plant management may do additional turbidity monitoring at other points to satisfy criteria in R309-215-7(2).

(4) Additional reporting and recordkeeping requirements for large surface water systems (serving greater than 10,000 population) reporting and recordkeeping requirements.

In addition to the reporting and recordkeeping requirements sub-sections (1), (2) and (3) above, a large surface water system that provides conventional filtration treatment or direct filtration shall report monthly to the Division the information specified in paragraphs (a) and (b) of this section. In addition to the reporting and recordkeeping requirements above, a public water system subject to the requirements of this subpart that provides filtration approved under R309-530-8 or R309-530-9 shall report monthly to the Division the information specified in paragraphs (a) of this section. The reporting in paragraph (a) of this section is in lieu of the reporting specified above.

(a) Turbidity measurements, as required in R309-200-5(5)(a), shall be reported within 10 days after the end of each month the system serves water to the public. Information that shall be reported includes:

(i) The total number of filtered water turbidity measurements taken during the month.

(ii) The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to 0.3 NTU or those levels established under R309-200-5(5)(a)(ii).

(iii) The date and value of any turbidity measurements taken during the month which exceed 1 NTU for systems using conventional filtration treatment or direct filtration, or which exceed the maximum level set by the Director under R309-530-8 or R309-530-9.

(b) Systems shall maintain the results of individual filter monitoring taken under R309-215-9(1)(b) for at least three years. Systems shall record the results of individual filter monitoring every 15 minutes. Systems shall report that they have conducted individual filter turbidity monitoring within 10 days after the end of each month the system serves water to the public. Systems shall report individual filter turbidity measurement results within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in paragraphs (b)(i) through (iv) of this section. Systems that use lime softening may apply to the Director for alternative exceedance levels for the levels specified in paragraphs (b)(i) through (iv) of this section if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.

(i) For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system shall report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system shall either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.

(ii) For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system shall report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system shall either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.

(iii) For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system shall report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system shall conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self assessment shall consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.

(iv) For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system shall report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system shall arrange for and conduct a comprehensive performance evaluation by the Director or a third party approved by the Director no later than 30 days following the exceedance and have the evaluation completed and submitted to the Division no later than 90 days following the exceedance.

(5) Additional reporting and recordkeeping requirements for surface water systems serving less than 10,000 population.

In addition to the reporting and recordkeeping requirements sub-sections (1), (2) and (3) above, a surface water system that provides conventional filtration treatment or direct filtration shall report monthly to the Division the information specified in paragraphs (a) and (b) of this section. In addition to the reporting and recordkeeping requirements above, a public water system subject to the requirements of this subpart that provides filtration approved under R309-530-8 or R309-530-9 shall report monthly to the Division the information specified in paragraphs (a) of this section. The reporting in paragraph (a) of this section is in lieu of the reporting specified above.

(a) Turbidity measurements, as required in R309-200-5(5)(a), shall be reported within 10 days after the end of each month the system serves water to the public. Information that shall be reported includes:

(i) The total number of filtered water turbidity measurements taken during the month.

(ii) The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to 0.3 NTU or those levels established under R309-200-5(5)(a)(ii).

(iii) The date and value of any turbidity measurements taken during the month which exceed 1 NTU for systems using conventional filtration treatment or direct filtration, or which exceed the maximum level set by the Director under R309-530-8 or R309-530-9.

(b) Systems shall maintain the results of individual filter monitoring taken under R309-215-9(1)(b) for at least three years. Systems shall record the results of individual filter monitoring every 15 minutes. Systems shall report that they have conducted individual filter turbidity monitoring within 10 days after the end of each month the system serves water to the public. Systems shall report individual filter turbidity measurement results within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in paragraphs (b)(i) through (iv) of this section. Systems that use lime softening may apply to the Director for alternative exceedance levels for the levels specified in paragraphs (b)(i) through (iv) of this section if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.

(i) For any individual filter (or CFE for systems with 2 filters that monitor CFE in lieu of individual filters) that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system shall report the filter number(s), the corresponding date(s), the turbidity values which exceeded 1.0 NTU, and the cause (if known) for the exceedance(s), to the Director by the 10th of the following month.

(ii) If a system was required to report to the Director for three months in a row and turbidity exceeded 1.0 NTU in two consecutive recordings taken 15 minutes apart at the same filter (or CFE for systems with 2 filters that monitor CFE in lieu of individual filters), the system shall conduct a self-assessment of the filter within 14 days of the day the filter exceeded 1.0 NTU in two consecutive measurements for the third straight month unless a CPE as specified in paragraph (iii) of this section was required. Systems with 2 filters that monitor CFE in lieu of individual filters must conduct a self assessment on both filters. The self-assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report. If a self-assessment is required, the date that it was triggered and the date that it was completed.

(iii) If a system was required to report to the Director for two months in a row and turbidity exceeded 2.0 NTU in two consecutive measurements taken 15 minutes apart at the same filter (or CFE for systems with 2 filters that monitor CFE in lieu of individual filters), the system shall arrange to have a comprehensive performance evaluation (CPE) conducted by the Director or a third party approved by the Director no later than 60 days following the day the filter exceeded 2.0 NTU in two consecutive measurements for the second straight month. If a CPE is required, the system must report a CPE required and the date it was triggered. If a CPE has been completed by the Director or a third party approved by the Director within the 12 prior months or the system and Division are jointly participating in an ongoing Comprehensive Technical Assistance (CTA) project at the system, a new CPE is not required. If conducted, a CPE must be completed and submitted to the Division no later than 120 days following the day the filter exceeded 2.0 NTU in two consecutive measurements for the second straight month.

(6) Additional reporting requirements.

(a) If at any time the turbidity exceeds 1 NTU in representative samples of filtered water in a system using conventional filtration treatment or direct filtration, the system shall inform the Division as soon as possible, but no later than the end of the next business day.

(b) If at any time the turbidity in representative samples of filtered water exceeds the maximum level set by the Director under R309-530-8 or R309-530-9 for filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration, the system shall inform the Division as soon as possible, but no later than the end of the next business day.

R309-215-10. Residual Disinfectant.

Treatment plant management shall continuously monitor disinfectant residuals and report the following to the Division within ten days after the end of each month that the system serves water to the public, except as otherwise noted:

(1) For each day, the lowest measurement of residual disinfectant concentration in mg/L in water entering the distribution system, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment. Systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies listed in Table 215.2 below:

TABLE 215-2 RESIDUAL GRAB SAMPLE FREQUENCY	
System size by population	Samples/day
Less than 500	1
501 to 1,000	2
1,001 to 2,500	3
2,501 to 3,300	4
Note: The day's samples cannot be taken at the same time. The sampling intervals are subject to Executive Secretary's review and approval.	

(2) The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/L and when the Division was notified of the occurrence. The system shall notify the Division as soon as possible, but no later than by the end of the next business day. The system also shall notify the Division by the end of the next business day whether or not the residual was restored to at least 0.2 mg/L within four hours.

(3) The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to R309-210-5:

(a) number of instances where the residual disinfectant concentration is measured;

(b) number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

(c) number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

(d) number of instances where no residual disinfectant concentration is detected and where HPC is greater than 500/ml;

(e) number of instances where the residual disinfectant concentration is not measured and HPC is greater than 500/ml;

(f) for the current and previous month the system serves water to the public, the value of "V" in the formula, V = ((c+d+e)/(a+b)) x 100, where a = the value in sub-section (a) above, b = the value in sub-section (b) above, c = the value in sub-section (c) above, d = the value in sub-section (d) above, and e = the value in sub-section (e) above.

R309-215-11. Waterborne Disease Outbreak.

Each public water system, upon discovering that a waterborne disease outbreak as defined in R309-110 potentially attributable to their water system has occurred, shall report that occurrence to the Division as soon as possible, but no later than by the end of the next business day.

R309-215-12. Monitoring Requirements for Disinfection Byproducts Precursors (DBPP).

(1) Routine monitoring. Surface water systems which use conventional filtration treatment (as defined in R309-110) shall monitor each treatment plant for TOC no later than the point of combined filter effluent turbidity monitoring and representative of the treated water. All systems required to monitor under this paragraph (1) shall also monitor for TOC in the source water prior to any treatment at the same time as monitoring for TOC in the treated water. These samples (source water and treated water) are referred to as paired samples. At the same time as the source water sample is taken, all systems shall monitor for alkalinity in the source water prior to any treatment. Systems shall take one paired sample and one source water alkalinity sample per month per plant at a time representative of normal operating conditions and influent water quality.

(2) Reduced monitoring. Surface water systems with an average treated water TOC of less than 2.0 mg/L for two consecutive years, or less than 1.0 mg/L for one year, may reduce monitoring for both TOC and alkalinity to one paired sample and one source water alkalinity sample per plant per quarter. The system shall revert to routine monitoring in the month following the quarter when the annual average treated water TOC is greater than or equal to 2.0 mg/L.

(3) Compliance shall be determined as specified by R309-215-13(3). Systems may begin monitoring to determine whether Step 1 TOC removals can be met 12 months prior to the compliance date for the system. This monitoring is not required and failure to monitor during this period is not a violation. However, any system that does not monitor during this period, and then determines in the first 12 months after the compliance date that it is not able to meet the Step 1 requirements in R309-215-13(2)(b) and shall therefore apply for alternate minimum TOC removal (Step 2) requirements, is not eligible for retroactive approval of alternate minimum TOC removal (Step 2) requirements as allowed pursuant to R309-215-

13(2)(c) and is in violation. Systems may apply for alternate minimum TOC removal (Step 2) requirements any time after the compliance date. For systems required to meet Step 1 TOC removals, if the value calculated under R309-215-13(3)(a)(iv) is less than 1.00, the system is in violation of the treatment technique requirements and shall notify the public pursuant to R309-220, in addition to reporting to the Director pursuant to R309-105-16.

R309-215-13. Treatment Technique for Control of Disinfection Byproduct Precursors (DBPP).

(1) Applicability.

(a) Surface water systems using conventional filtration treatment (as defined in R309-110) shall operate with enhanced coagulation or enhanced softening to achieve the TOC percent removal levels specified in paragraph (2) of this section unless the system meets at least one of the alternative compliance criteria listed in paragraph (1)(b) or (1)(c) of this section.

(b) Alternative compliance criteria for enhanced coagulation and enhanced softening systems. Surface Water Systems using conventional filtration treatment may use the alternative compliance criteria in paragraphs (1)(b)(i) through (vi) of this section to comply with this section in lieu of complying with paragraph (2) of this section. Systems shall still comply with monitoring requirements in R309-215-12.

(i) The system's source water TOC level, measured according to R309-200-4(3), is less than 2.0 mg/L, calculated quarterly as a running annual average.

(ii) The system's treated water TOC level, measured according to R309-200-4(3), is less than 2.0 mg/L, calculated quarterly as a running annual average

(iii) The system's source water TOC level, measured according to R309-200-4(3), is less than 4.0 mg/L, calculated quarterly as a running annual average; the source water alkalinity, measured according to R309-200-4(3), is greater than 60 mg/L (as $CaCO_3$), calculated quarterly as a running annual average; and either the TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively; or prior to the effective date for compliance in R309-210-8(1)(a), the system has made a clear and irrevocable financial commitment not later than the effective date for compliance in R309-210-8(1)(a) to use of technologies that will limit the levels of TTHMs and HAA5 to no more than 0.040 mg/L and 0.030 mg/L, respectively. Systems shall submit evidence of a clear and irrevocable financial commitment, in addition to a schedule containing milestones and periodic progress reports for installation and operation of appropriate technologies, to the Director for approval not later than the effective date for compliance in R309-210-8(1)(a). These technologies shall be installed and

operating not later than June 30, 2005. Failure to install and operate these technologies by the date in the approved schedule will constitute a violation of National Primary Drinking Water Regulations.

(iv) The TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively, and the system uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.

(v) The system's source water SUVA, prior to any treatment and measured monthly according to R309-200-4(3), is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

(vi) The system's finished water SUVA, measured monthly according to R309-200-4(3), is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

(c) Additional alternative compliance criteria for softening systems. Systems practicing enhanced softening that cannot achieve the TOC removals required by paragraph (2)(b) of this section may use the alternative compliance criteria in paragraphs (1)(c)(i) and (ii) of this section in lieu of complying with paragraph (2) of this section. Systems shall still comply with monitoring requirements in R309-210-8(4).

(i) Softening that results in lowering the treated water alkalinity to less than 60 mg/L (as $CaCO_3$), measured monthly according to R309-200-4(3) and calculated quarterly as a running annual average.

(ii) Softening that results in removing at least 10 mg/L of magnesium hardness (as $CaCO_3$), measured monthly according to R309-200-4(3) and calculated quarterly as an annual running average.

(2) Enhanced coagulation and enhanced softening performance requirements.

(a) Systems shall achieve the percent reduction of TOC specified in paragraph (2)(b) of this section between the source water and the combined filter effluent, unless the Director approves a system's request for alternate minimum TOC removal (Step 2) requirements under paragraph (2)(c) of this section.

(b) Required Step 1 TOC reductions, indicated in the following table, are based upon specified source water parameters measured in accordance with R309-200-4(3). Systems practicing softening are required to meet the Step 1 TOC reductions in the far-right column (Source water alkalinity >120 mg/L) for the specified source water TOC:

TABLE 215-3 Step 1 Required Removal of TOC by Enhanced Coagulation and Enhanced Softening for Surface Water Systems Using Conventional Treatment (See Notes 1,2)			
Source-Water TOC, mg/l	Source-Water Alkalinity, mg/L as CaCO3		
	0 – 60	>60 – 120	>120 (Note 3)
>2.0-4.0	35.0%	25.0%	15.0%
>4.0-8.0	45.0%	35.0%	25.0%
>8.0	50.0%	40.0%	30.0%
Note 1: Systems meeting at least one of the conditions in paragraph (1)(b)(i)-(vi) of this section are not required to operate with enhanced coagulation.			
Note 2: Softening systems meeting one of the alternative compliance criteria in paragraph (1)(c) of this section are not required to operate with enhanced softening.			
Note 3: Systems practicing softening shall meet the TOC removal requirements in this column.			

(c) Surface water systems using conventional treatment systems that cannot achieve the Step 1 TOC removals required by paragraph (2)(b) of this section due to water quality parameters or operational constraints shall apply to the Director, within three months of failure to achieve the TOC removals required by paragraph (2)(b) of this section, for approval of alternative minimum TOC removal (Step 2) requirements submitted by the system. If the Director approves the alternative minimum TOC removal (Step 2) requirements, the Director may make those requirements retroactive for the purposes of determining compliance. Until the Director approves the alternate minimum TOC removal (Step 2) requirements, the system shall meet the Step 1 TOC removals contained in paragraph (2)(b) of this section.

(d) Alternate minimum TOC removal (Step 2) requirements. Applications made to the Director by enhanced coagulation systems for approval of alternate minimum TOC removal (Step 2) requirements under paragraph (2)(c) of this section shall include, at a minimum, results of bench- or pilot-scale testing conducted under paragraph (2)(d)(i) of this section. The submitted bench- or pilot- scale testing shall be used to determine the alternate enhanced coagulation level.

(i) Alternate enhanced coagulation level is defined as: Coagulation at a coagulant dose and pH as determined by the method described in paragraphs (2)(d)(i) through (v) of this section such that an incremental addition of 10 mg/L of alum (or equivalent amount of ferric salt) results in a TOC removal of less than or equal to 0.3 mg/L. The percent removal of TOC at this point on the "TOC removal versus coagulant dose" curve is then defined as the minimum TOC removal required for the system. Once approved by the

Director, this minimum requirement supersedes the minimum TOC removal required by the table in paragraph (2)(b) of this section. This requirement will be effective until such time as the Director approves a new value based on the results of a new bench- and pilot-scale test. Failure to achieve Director set alternative minimum TOC removal levels is a violation of R309-215-13.

(ii) Bench- or pilot-scale testing of enhanced coagulation shall be conducted by using representative water samples and adding 10 mg/L increments of alum (or equivalent amounts of ferric salt) until the pH is reduced to a level less than or equal to the enhanced coagulation Step 2 target pH shown in the following table 215-4:

TABLE 215-4 ENHANCED COAGULATION STEP 2 TARGET pH	
ALKALINITY (mg/L as CaCO3)	TARGET pH
0-60	5.5
>60-120	6.3
>120-240	7.0
>240	7.5

(iii) For waters with alkalinities of less than 60 mg/L for which addition of small amounts of alum or equivalent addition of iron coagulant drives the pH below 5.5 before significant TOC removal occurs, the system shall add necessary chemicals to maintain the pH between 5.3 and 5.7 in samples until the TOC removal of 0.3 mg/L per 10 mg/L alum added (or equivalant addition of iron coagulant) is reached.

(iv) The system may operate at any coagulant dose or pH necessary (consistent with other NPDWRs) to achieve the minimum TOC percent removal approved under paragraph (2)(c) of this section.

(v) If the TOC removal is consistently less than 0.3 mg/L of TOC per 10 mg/L of incremental alum dose at all dosages of alum (or equivalant addition of iron coagulant), the water is deemed to contain TOC not amenable to enhanced coagulation. The system may then apply to the Director for a waiver of enhanced coagulation requirements.

(3) Compliance Calculations.

(a) Surface Water Systems other than those identified in paragraphs (1)(b) or (1)(c) of this section shall comply with requirements contained in paragraphs (2)(b) or (2)(c) of this section. Systems shall calculate compliance quarterly, beginning after the system has collected 12 months of data, by determining an annual average using the following method:

(i) Determine actual monthly TOC percent removal, equal to: (1 - (treated water TOC/source water TOC)) x 100.

(ii) Determine the required monthly TOC percent removal (from either the table in paragraph (2)(b) of this section or from paragraph (2)(c) of this section).

(iii) Divide the value in paragraph (3)(a)(i) of this section by the value in paragraph (3)(a)(ii) of this section.

(iv) Add together the results of paragraph (3)(a)(iii) of this section for the last 12 months and divide by 12.

(v) If the value calculated in paragraph (3)(a)(iv) of this section is less than 1.00, the system is not in compliance with the TOC percent removal requirements.

(b) Systems may use the provisions in paragraphs (3)(b)(i) through (v) of this section in lieu of the calculations in paragraph (3)(a)(i) through (v) of this section to determine compliance with TOC percent removal requirements.

(i) In any month that the system's treated or source water TOC level, measured according to R309-200-4(3), is less than 2.0 mg/L, the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (3)(a)(iii) of this section) when calculating compliance under the provisions of paragraph (3)(a) of this section.

(ii) In any month that a system practicing softening removes at least 10 mg/L of magnesium hardness (as $CaCO_3$), the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (3)(a)(iii) of this section) when calculating compliance under the provisions of paragraph (3)(a) of this section.

(iii) In any month that the system's source water SUVA, prior to any treatment and measured according to R309-200-4(3), is less than or equal to 2.0 L/mg-m, the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (3)(a)(iii) of this section) when calculating compliance under the provisions of paragraph (3)(a) of this section.

(iv) In any month that the system's finished water SUVA, measured according to R309-200-4(3), is less than or equal to 2.0 L/mg-m, the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (3)(a)(iii) of this section) when calculating compliance under the provisions of paragraph (3)(a) of this section.

(v) In any month that a system practicing enhanced softening lowers alkalinity below 60 mg/L (as $CaCO_3$), the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (3)(a)(iii) of this section) when calculating compliance under the provisions of paragraph (3)(a) of this section.

(c) Surface Water Systems using conventional treatment may also comply with the requirements of this section by meeting the criteria in paragraph (1)(b) or (c) of this section.

(4) Treatment Technique Requirements for DBP Precursors.

The Director identifies the following as treatment techniques to control the level of disinfection byproduct precursors in drinking water treatment and distribution systems: For Surface Water Systems using conventional treatment, enhanced coagulation or enhanced softening.

R309-215-14. Disinfection Profiling and Benchmarking.

A disinfection profile is a graphical representation of your system's level of Giardia lamblia or virus inactivation measured during the course of a year. Community or non-transient non-community water systems which use surface water or ground water under the direct influence of surface must develop a disinfection profile unless the Director determines that a system's profile is unnecessary. The Director may approve the use of a more representative data set for disinfection profiling than the data set required under R309-215-14.

(1) Determination of systems required to profile.

A public water system subject to the requirements of this subpart shall determine its TTHM annual average using the procedure in paragraph (1)(a) of this section and its HAA5 annual average using the procedure in paragraph (1)(b) of this section. The annual average is the arithmetic average of the quarterly averages of four consecutive quarters of monitoring.

(a) The TTHM annual average shall be the annual average during the same period as is used for the HAA5 annual average.

(i) Those systems that collected data under the provisions of 40 CFR 141.142 subpart M (Information Collection Rule) shall use the results of the samples collected during the last four quarters of required monitoring.

(ii) Those systems that use grandfathered HAA5 occurrence data that meet the provisions of paragraph (1)(b)(ii) of this section shall use TTHM data

collected at the same time under the provisions of R309-200-5(3)(c)(vii) and R309-210-9.

(iii) Those systems that use HAA5 occurrence data that meet the provisions of paragraph (1)(b)(iii)(A) of this section shall use TTHM data collected at the same time under the provisions of R309-200-5(3)(c)(vii) and R309-210-9.

(b) The HAA5 annual average shall be the annual average during the same period as is used for the TTHM annual average.

(i) Those systems that collected data under the provisions of 40 CFR 141.142 subpart M (Information Collection Rule) shall use the results of the samples collected during the last four quarters of required monitoring.

(ii) Those systems that have collected four quarters of HAA5 occurrence data that meets the routine monitoring sample number and location requirements for TTHM in R309-200-5(3)(c)(vii) and R309-210-9 and handling and analytical method requirements of R309-200-4(3) may use those data to determine whether the requirements of this section apply.

(iii) Those systems that have not collected four quarters of HAA5 occurrence data that meets the provisions of either paragraph (1)(b)(i) or (ii) of this section by March 16, 1999 shall either:

(A) Conduct monitoring for HAA5 that meets the routine monitoring sample number and location requirements for TTHM in R309-200-5(3)(c)(vii) and R309-210-9 and handling and analytical method requirements of R309-200-4(3) to determine the HAA5 annual average and whether the requirements of paragraph (2) of this section apply. This monitoring shall be completed so that the applicability determination can be made no later than March 31, 2000, or

(B) Comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with paragraph (2) of this section.

(c) The system may request that the Director approve a more representative annual data set than the data set determined under paragraph (1)(a) or (b) of this section for the purpose of determining applicability of the requirements of this section.

(d) The Director may require that a system use a more representative annual data set than the data set determined under paragraph (1)(a) or (b) of this section for the purpose of determining applicability of the requirements of this section.

(e) The system shall submit data to the Director on the schedule in paragraphs (1)(e)(i) through (v) of this section.

(i) Those systems that collected TTHM and HAA5 data under the provisions of subpart M (Information Collection Rule), as required by paragraphs (1)(a)(i) and (1)(b)(i) of this section, shall submit the results of the samples collected during the last 12 months of required monitoring under 40 CFR section 141.142 (Information Collection Rule) not later than December 31, 1999.

(ii) Those systems that have collected four consecutive quarters of HAA5 occurrence data that meets the routine monitoring sample number and location for TTHM in R309-200-5(3)(c)(vii) and R309-210-9 and handling and analytical method requirements of R309-200-4(3), as allowed by paragraphs (1)(a)(ii) and (1)(b)(ii) of this section, shall submit those data to the Director not later April 16, 1999. Until the Director has approved the data, the system shall conduct monitoring for HAA5 using the monitoring requirements specified under paragraph (1)(b)(iii) of this section.

(iii) Those systems that conduct monitoring for HAA5 using the monitoring requirements specified by paragraphs (1)(a)(iii) and (1)(b)(iii)(A) of this section, shall submit TTHM and HAA5 data not later than April 1, 2000.

(iv) Those systems that elect to comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with this section, as allowed under paragraphs (1)(b)(iii)(B) of this section, shall notify the Director in writing of their election not later than December 31, 1999.

(v) If the system elects to request that the Director approve a more representative annual data set than the data set determined under paragraph (1)(b)(i) of this section, the system shall submit this request in writing not later than December 31, 1999.

(f) Any system having either a TTHM annual average greater than or equal to 0.064 mg/L or an HAA5 annual average greater than or equal to 0.048 mg/L during the period identified in paragraphs (1)(a) and (b) of this section shall comply with paragraph (2) of this section.

(g) The Director may only determine that a system's profile is unnecessary if a system's TTHM and HAA5 levels are below 0.064 mg/L and 0.048 mg/L, respectively. To determine these levels, TTHM and HAA5 samples must be collected after January 1, 1998, during the month with the warmest water temperature, and at the point of maximum residence time in your distribution system. The Director may approve a more representative TTHM and HAA5 data set to determine these levels.

(2) Disinfection profiling.

(a) Any system that is required by paragraph (1) of this section shall develop a disinfection profile of its disinfection practice for a period of up to three years. A disinfection profile consists of the following 3 steps:

(i) The system must collect data for several parameters from the plant over the course of 12 months. If your system serves between 500 and 9,999 persons you must begin to collect data no later than July 1, 2003. If your system serves fewer than 500 persons you must begin to collect data no later than January 1, 2004. If your system serves 10,000 persons or greater than the requirements of R309-215-14(2) are only required if it meets the criteria in paragraph R309-215-14(1)(f).

(ii) The system must use this data to calculate weekly log inactivation as discussed in paragraph (d) of this section.

(iii) The system must use these weekly log inactivations to develop a disinfection profile.

(b) The system shall monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 1.1-1.6, 2.1, and 3.1 of Section 141.74(b)(3) in the code of Federal Regulations (also available from the Division), as appropriate, through the entire treatment plant. This system shall begin this monitoring not later than April 1, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system shall conduct the monitoring in paragraphs (2)(b)(i) through (iv) of this section. A system with more than one point of disinfectant application shall conduct the monitoring in paragraphs (2)(b)(i) through (iv) of this section for each disinfection segment. The system shall monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in R309-200-4(3), as follows:

(i) The temperature of the disinfected water shall be measured once per day at each residual disinfectant concentration sampling point during peak hourly flow.

(ii) If the system uses chlorine, the pH of the disinfected water shall be measured once per day at each chlorine residual disinfectant concentration sampling point during peak hourly flow.

(iii) The disinfectant contact time(s) ("T") shall be determined for each day during peak hourly flow.

(iv) The residual disinfectant concentration(s) ("C") of the water before or at the first customer and prior to each additional point of disinfection shall be measured each day during peak hourly flow.

(v) For systems serving less than 10,000 persons, the above parameters shall be monitored once per week on the same calendar day, over 12 consecutive months for the purposes of disinfection profiling.

(c) In lieu of the monitoring conducted under the provisions of paragraph (2)(b) of this section to develop the disinfection profile, the system may elect to meet the requirements of paragraph (2)(c)(i) of this section. In addition to the monitoring conducted under the provisions of paragraph (2)(b) of this section to develop the disinfection profile, the system may elect to meet the requirements of paragraph (2)(c)(ii) of this section.

(i) A PWS that has three years of existing operational data may submit those data, a profile generated using those data, and a request that the Director approve use of those data in lieu of monitoring under the provisions of paragraph (2)(b) of this section not later than March 31, 2000. The Director shall determine whether these operational data are substantially equivalent to data collected under the provisions of paragraph (2)(b) of this section. These data shall also be representative of Giardia lamblia inactivation through the entire treatment plant and not just of certain treatment segments. Until the Director approves this request, the system is required to conduct monitoring under the provisions of paragraph (2)(b) of this section.

(ii) In addition to the disinfection profile generated under paragraph (2)(b) of this section, a PWS that has existing operational data may use those data to develop a disinfection profile for additional years. Such systems may use these additional yearly disinfection profiles to develop a benchmark under the provisions of paragraph (3) of this section. The Director shall determine whether these operational data are substantially equivalent to data collected under the provisions of paragraph (2)(b) of this section. These data shall also be representative of inactivation through the entire treatment plant and not just of certain treatment segments.

(d) The system shall calculate the total inactivation ratio as follows:

(i) If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio for the disinfection segment based on either of the methods in paragraph (2)(d)(i)(A) or (2)(d)(i)(B) of this section.

(A) Determine one inactivation ratio ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow.

(B) Determine successive CTcalc/$CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system shall calculate the total inactivation ratio by determining (CTcalc/$CT_{99.9}$) for each sequence and then adding the (CTcalc/$CT_{99.9}$) values together to determine sum of (CTcalc/$CT_{99.9}$).

(ii) If the system uses more than one point of disinfectant application before the first customer, the system shall determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The (CTcalc/$CT_{99.9}$) value of each segment and sum of (CTcalc/$CT_{99.9}$) shall be calculated using the method in paragraph (b)(4)(i) of this section.

(iii) The system shall determine the total logs of inactivation by multiplying the value calculated in paragraph (2)(d)(i) or (ii) of this section by 3.0.

(e) A system that uses either chloramines and chlorine dioxide or ozone for primary disinfection shall also calculate the logs of inactivation for viruses using a method approved by the Director.

(f) The system shall retain disinfection profile data in graphic form, as a spreadsheet, or in some other format acceptable to the Director for review as part of sanitary surveys conducted by the Director.

(3) Disinfection Benchmarking

(a) Any system required to develop a disinfection profile under the provisions of paragraphs (1) and (2) of this section and that decides to make a significant change to its disinfection practice shall consult with the Director prior to making such change. Significant changes to disinfection practice are:

(i) Changes to the point of disinfection;

(ii) Changes to the disinfectant(s) used in the treatment plant;

(iii) Changes to the disinfection process; and

(iv) Any other modification identified by the Director.

(b) Any system that is modifying its disinfection practice shall calculate its disinfection benchmark using the procedure specified in paragraphs (3)(b)(i) through (ii) of this section.

(i) For each year of profiling data collected and calculated under paragraph (2) of this section, the system shall determine the lowest average monthly Giardia lamblia inactivation in each year of profiling data. The system shall determine the average Giardia lamblia inactivation for each calendar month for each year of profiling data by dividing the sum of daily Giardia lamblia of inactivation by the number of values calculated for that month.

(ii) The disinfection benchmark is the lowest monthly average value (for systems with one year of profiling data) or average of lowest monthly average values (for systems with more than one year of profiling data) of the monthly logs of Giardia lamblia inactivation in each year of profiling data.

(c) A system that uses either chloramines, ozone or chlorine dioxide for primary disinfection must calculate the disinfection benchmark from the data the system collected for viruses to develop the disinfection profile in addition to the Giardia lamblia disinfection benchmark calculated under paragraph (b)(i) above. This viral benchmark must be calculated in the same manner used to calculate the Giardia lamblia disinfection benchmark in paragraph (b)(i).

(d) The system shall submit information in paragraphs (3)(d)(i) through (iv) of this section to the Director as part of its consultation process.

(i) A description of the proposed change;

(ii) The disinfection profile for Giardia lamblia (and, if necessary, viruses) under paragraph (2) of this section and benchmark as required by paragraph (3)(b) of this section; and

(iii) An analysis of how the proposed change will affect the current levels of disinfection.

(iv) Any additional information requested by the Director.

R309-215-15. Enhanced Treatment for Cryptosporidium (Federal Subpart W).

(1) General requirements.

(a) The rule requirements of this section establish or extend treatment technique requirements in lieu of maximum contaminant levels for Cryptosporidium. These requirements are in addition to requirements for filtration and disinfection in R309-200 and other parts of R309-215.

(b) Applicability. The requirements of this subpart apply to all surface water systems, which are public water systems supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water.

(i) Wholesale systems, as defined in R309-110, must comply with the requirements of this section based on the population of the largest system in the combined distribution system.

(ii) The requirements of this sub-section apply to systems required by these rules to provide filtration treatment, whether or not the system is currently operating a filtration system.

(c) Requirements. Systems subject to this subpart must comply with the following requirements:

(i) Systems must conduct an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI source. This monitoring may include sampling for Cryptosporidium, E. coli, and turbidity as described in R309-215-15(2) through R309-215-15(7), to determine what level, if any, of additional Cryptosporidium treatment they must provide.

(ii) Systems that plan to make a significant change to their disinfection practice must develop disinfection profiles and calculate disinfection benchmarks, as described in R309-215-15(9) through R309-215-15(10).

(iii) Filtered systems must determine their Cryptosporidium treatment bin classification as described in R309-215-15(11) and provide additional treatment for Cryptosporidium, if required, as described in R309-215-15(12). Filtered must implement Cryptosporidium treatment according to the schedule in R309-215-14.

(iv) Systems required to provide additional treatment for Cryptosporidium must implement microbial toolbox options that are designed and operated as described in R309-215-15(15) through R309-215-15(20).

(v) Systems must comply with the applicable recordkeeping and reporting requirements described in R309-215-15(21) through R309-215-15(22).

(vi) Systems must address significant deficiencies identified in sanitary surveys performed by EPA as described in R309-215-15(22).

(2) Source Water Monitoring Requirements.

(a) Initial round of source water monitoring. Systems must conduct the following monitoring on the schedule in paragraph (c) of this section unless they meet the monitoring exemption criteria in paragraph (d) of this section.

(i) Filtered systems serving at least 10,000 people must sample their source water for Cryptosporidium, E. coli, and turbidity at least monthly for 24 months.

(ii) (A) Filtered systems serving fewer than 10,000 people must sample their source water for E. coli at least once every two weeks for 12 months.

(b) A filtered system serving fewer than 10,000 people may avoid E. coli monitoring if the system notifies the Director that it will monitor for Cryptosporidium as described in paragraph (a)(iv) of this section. The system must notify the Director no later than 3 months prior to the date the system is otherwise required to start E. coli monitoring under R309-215-15(2)(c).

(iii) Filtered systems serving fewer than 10,000 people must sample their source water for Cryptosporidium at least twice per month for 12 months or at least monthly for 24 months if they meet one of the following, based on monitoring conducted under paragraph (a)(iii) of this section:

(A) For systems using lake/reservoir sources, the annual mean E. coli concentration is greater than 10 E. coli/ 100 mL.

(B) For systems using flowing stream sources, the annual mean E. coli concentration is greater than 50 E. coli/ 100 mL.

(C) The system does not conduct E. coli monitoring as described in paragraph (a)(iii) of this section.

(D) Systems using ground water under the direct influence of surface water (GWUDI) must comply with the requirements of paragraph (a)(iv) of this section based on the E. coli level that applies to the nearest surface water body. If no surface water body is nearby, the system must comply based on the requirements that apply to systems using lake/reservoir sources.

(iv) For filtered systems serving fewer than 10,000 people, the Director may approve monitoring for an indicator other than E. coli under paragraph (a)(ii) of this section. The Director also may approve an alternative to the E. coli concentration in paragraph (a)(iii)(A), (B) or (D) of this section to trigger Cryptosporidium monitoring. This approval by the Director must be provided to the system in writing and must include the basis for the Director's determination that the alternative indicator and/or trigger level will

provide a more accurate identification of whether a system will exceed the Bin 1 Cryptosporidium level in R309-215-15(11).

(v) Systems may sample more frequently than required under this section if the sampling frequency is evenly spaced throughout the monitoring period.

(b) Second round of source water monitoring. Systems must conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in paragraph (a) of this section, unless they meet the monitoring exemption criteria in paragraph (d) of this section. Systems must conduct this monitoring on the schedule in paragraph (c) of this section.

(c) Monitoring schedule. Systems must begin the monitoring required in paragraphs (a) and (b) of this section no later than the month beginning with the date listed:

(i) Systems that serve at least 100,000 people must:

(A) begin the first round of source water monitoring no later than October 1, 2006; and

(B) begin the second round of source water monitoring no later than April 1, 2015.

(ii) Systems that serve from 50,000 to 99,999 people must:

(A) begin the first round of source water monitoring no later than April 1, 2007; and

(B) begin the second round of source water monitoring no later than October 1, 2015.

(iii) Systems that serve from 10,000 to 49,999 people must:

(A) begin the first round of source water monitoring no later than April 1, 2008; and

(B) begin the second round of source water monitoring no later than October 1, 2016.

(iv) Systems that serve less than 10,000 people and monitor for E. coli must:

(A) begin the first round of source water monitoring no later than October 1, 2008; and

(B) begin the second round of source water monitoring no later than October 1, 2017.

(C) Applies only to filtered systems.

(v) Systems that serve less than 10,000 people and monitor for Cryptosporidium must:

(A) begin the first round of source water monitoring no later than April 1, 2010; and

(B) begin the second round of source water monitoring no later than April 1, 2019.

(C) Applies to filtered systems that meet the conditions of paragraph (a)(iii) of this section.

(d) Monitoring avoidance.

(i) Filtered systems are not required to conduct source water monitoring under this sub-section if the system will provide a total of at least 5.5-log of treatment for Cryptosporidium, equivalent to meeting the treatment requirements of Bin 4 in R309-215-15(12).

(ii) If a system chooses to provide the level of treatment in paragraph (d)(i) of this section rather than start source monitoring, the system must notify the Director in writing no later than the date the system is otherwise required to submit a sampling schedule for monitoring under R309-215-15(3). Alternatively, a system may choose to stop sampling at any point after it has initiated monitoring if it notifies the Director in writing that it will provide this level of treatment. Systems must install and operate technologies to provide this level of treatment by the applicable compliance dates in R309-215-15(13).

(e) Plants operating only part of the year. Systems with surface water plants that operate for only part of the year must conduct source water monitoring in accordance with this subpart, but with the following modifications:

(i) Systems must sample their source water only during the months that the plant operates unless the Director specifies another monitoring period based on plant operating practices.

(ii) Systems with plants that operate less than six months per year and that monitor for Cryptosporidium must collect at least six Cryptosporidium samples per year during each of two years of monitoring. Samples must be evenly spaced throughout the period the plant operates.

(f) (i) New sources. A system that begins using a new source of surface water or GWUDI after the system is required to begin monitoring under paragraph (c) of this section must monitor the new source on a schedule the Director approves. Source water monitoring must meet the requirements of this sub-section. The system must also meet the bin classification and Cryptosporidium treatment requirements of R309-215-15(11) and (12) for the new source on a schedule the Director approves.

(ii) The requirements of R309-215-15(2)(f) apply to surface water systems that begin operation after the monitoring start date applicable to the system's size under paragraph (c) of this section.

(iii) The system must begin a second round of source water monitoring no later than 6 years following initial bin classification under R309-215-15(11).

(g) Failure to collect any source water sample required under this section in accordance with the sampling schedule, sampling location, analytical method, approved laboratory, and reporting requirements of R309-215-15(3) through R309-215-15(7) is a monitoring violation.

(h) Grandfathering monitoring data. Systems may use (grandfather) monitoring data collected prior to the applicable monitoring start date in paragraph (c) of this section to meet the initial source water monitoring requirements in paragraph (a) of this section. Grandfathered data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted under this paragraph must meet the requirements in R309-215-15(8).

(3) Sampling schedules.

(a) Systems required to conduct source water monitoring under R309-215-15(2) must submit a sampling schedule that specifies the calendar dates when the system will collect each required sample.

(i) Systems must submit sampling schedules no later than 3 months prior to the applicable date listed in R309-215-15(2)(c) for each round of required monitoring.

(ii) (A) Systems serving at least 10,000 people must submit their sampling schedule for the initial round of source water monitoring under R309-215-15(2)(a) to EPA electronically at https:// intranet.epa.gov/lt2/.

(B) If a system is unable to submit the sampling schedule electronically, the system may use an alternative approach for submitting the sampling schedule that EPA approves.

(iii) Systems serving fewer than 10,000 people must submit their sampling schedules for the initial round of source water monitoring R309-215-15(2)(a) to the Director.

(iv) Systems must submit sampling schedules for the second round of source water monitoring R309-215-15(2)(b) to the Director.

(v) If EPA or the Director does not respond to a system regarding its sampling schedule, the system must sample at the reported schedule.

(b) Systems must collect samples within two days before or two days after the dates indicated in their sampling schedule (i.e., within a five-day period around the schedule date) unless one of the conditions of paragraph (b)(i) or (ii) of this section applies.

(i) If an extreme condition or situation exists that may pose danger to the sample collector, or that cannot be avoided and causes the system to be unable to sample in the scheduled five-day period, the system must sample as close to the scheduled date as is feasible unless the Director approves an alternative sampling date. The system must submit an explanation for the delayed sampling date to the Director concurrent with the shipment of the sample to the laboratory.

(ii) (A) If a system is unable to report a valid analytical result for a scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements, including the quality control requirements in R309-215-15(5), or the failure of an approved laboratory to analyze the sample, then the system must collect a replacement sample.

(B) The system must collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date unless the system demonstrates that collecting a replacement sample within this time frame is not feasible or the Director approves an alternative resampling date. The system must submit an explanation for the delayed sampling date to the Director concurrent with the shipment of the sample to the laboratory.

(c) Systems that fail to meet the criteria of paragraph (b) of this section for any source water sample required under R309-215-15(2) must revise their sampling schedules to add dates for collecting all missed samples. Systems must submit the revised schedule to the Director for approval prior to when the system begins collecting the missed samples.

(4) Sampling locations.

(a) Systems required to conduct source water monitoring under R309-215-15(2) must collect samples for each plant that treats a surface water or GWUDI source. Where multiple plants draw water from the same influent, such as the same pipe or intake, the Director may approve one set of monitoring results to be used to satisfy the requirements of R309-215-15(2) for all plants.

(b) (i) Systems must collect source water samples prior to chemical treatment, such as coagulants, oxidants and disinfectants, unless the system meets the condition of paragraph (b)(ii) of this section.

(ii) The Director may approve a system to collect a source water sample after chemical treatment. To grant this approval, the Director must determine that collecting a sample prior to chemical treatment is not feasible for the system and that the chemical treatment is unlikely to have a significant adverse effect on the analysis of the sample.

(c) Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition.

(d) Bank filtration.

(i) Systems that receive Cryptosporidium treatment credit for bank filtration under R309-200-5(5)(a)(ii) must collect source water samples in the surface water prior to bank filtration.

(ii) Systems that use bank filtration as pretreatment to a filtration plant must collect source water samples from the well (i.e., after bank filtration). Use of bank filtration during monitoring must be consistent with routine operational practice. Systems collecting samples after a bank filtration process may not receive treatment credit for the bank filtration under R309-215-15(16)(c).

(e) Multiple sources. Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and ground water sources, must collect samples as specified in paragraph (e)(i) or (ii) of this section. The use of multiple sources during monitoring must be consistent with routine operational practice.

(i) If a sampling tap is available where the sources are combined prior to treatment, systems must collect samples from the tap.

(ii) If a sampling tap where the sources are combined prior to treatment is not available, systems must collect samples at each source near the intake on the same day and must follow either paragraph (e)(ii)(A) or (B) of this section for sample analysis.

(A) Systems may composite samples from each source into one sample prior to analysis. The volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected.

(B) Systems may analyze samples from each source separately and calculate a weighted average of the analysis results for each sampling date. The weighted average must be calculated by multiplying the analysis result for each source by the fraction the source contributed to total plant flow at the time the sample was collected and then summing these values.

(f) Additional Requirements. Systems must submit a description of their sampling location(s) to the Director at the same time as the sampling schedule required under R309-215-15(3). This description must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle. If the Director does not respond to a system regarding sampling location(s), the system must sample at the reported location(s).

(5) Analytical methods.

(a) Cryptosporidium. Systems must analyze for Cryptosporidium using Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-002 or Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-001, which are incorporated by reference. You may obtain a copy of these methods online from http:// www.epa.gov/safewater/disinfection/lt2 or from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave., NW, Washington, DC 20460 (Telephone: 800-426-4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202-566-2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations. html. You may also obtain a copy of these methods by contacting the Division of Drinking Water at 801-536-4200.

(i) Systems must analyze at least a 10 L sample or a packed pellet volume of at least 2 mL as generated by the methods listed in paragraph (a) of this section. Systems unable to process a 10 L sample must analyze as much sample volume as can be filtered by two filters approved by EPA for the

methods listed in paragraph (a) of this section, up to a packed pellet volume of at least 2 mL.

(ii) (A) Matrix spike (MS) samples, as required by the methods in paragraph (a) of this section, must be spiked and filtered by a laboratory approved for Cryptosporidium analysis under R309-215-15(6).

(B) If the volume of the MS sample is greater than 10 L, the system may filter all but 10 L of the MS sample in the field, and ship the filtered sample and the remaining 10 L of source water to the laboratory. In this case, the laboratory must spike the remaining 10 L of water and filter it through the filter used to collect the balance of the sample in the field.

(iii) Flow cytometer-counted spiking suspensions must be used for MS samples and ongoing precision and recovery (OPR) samples.

(b) E. coli. Systems must use methods for enumeration of E. coli in source water approved in R309-200-4(3) and (4).

(i) The time from sample collection to initiation of analysis may not exceed 30 hours unless the system meets the condition of paragraph (b)(ii) of this section.

(ii) The Director may approve on a case-by-case basis the holding of an E. coli sample for up to 48 hours between sample collection and initiation of analysis if the Director determines that analyzing an E. coli sample within 30 hours is not feasible. E. coli samples held between 30 to 48 hours must be analyzed by the Colilert reagent version of Standard Method 9223B as listed in R309-200-4(3) and (4).

(iii) Systems must maintain samples between 0 deg.C and 10 deg. C during storage and transit to the laboratory.

(c) Turbidity. Systems must use methods for turbidity measurement approved in R309-200-4(3) and (4).

(6) Approved laboratories.

(a) Cryptosporidium. Systems must have Cryptosporidium samples analyzed by a laboratory that is approved under EPA's Laboratory Quality Assurance Evaluation Program for Analysis of Cryptosporidium in Water or a laboratory that has been certified for Cryptosporidium analysis by an equivalent State laboratory certification program.

(b) E. coli. Any laboratory certified by the EPA, the National Environmental Laboratory Accreditation Conference or the State for total coliform or fecal coliform analysis under R309-200-4(3) and (4) is approved for E. coli analysis under this subpart when the laboratory uses the same technique for E. coli that the laboratory uses for R309-200-4(3), (4) and in R444-14-4(1).

(c) Turbidity. Measurements of turbidity must be made by a party approved by the State.

(7) Reporting source water monitoring results.

(a) Systems must report results from the source water monitoring required under R309-215-15(2) no later than 10 days after the end of the first month following the month when the sample is collected.

(b) (i) All systems serving at least 10,000 people must report the results from the initial source water monitoring required under R309-215-15(2)(a) to EPA electronically at https:// intranet.epa.gov/lt2/.

(ii) If a system is unable to report monitoring results electronically, the system may use an alternative approach for reporting monitoring results that EPA approves.

(c) Systems serving fewer than 10,000 people must report results from the initial source water monitoring required under R309-215-15(2)(a) to the Director.

(d) All systems must report results from the second round of source water monitoring required under R309-215-15(2)(b) to the Director.

(e) Systems must report the applicable information in paragraphs (e)(i) and (ii) of this section for the source water monitoring required under R309-215-15(2).

(i) Systems must report the following data elements for each Cryptosporidium analysis:

(A) PWS ID.

(B) Facility ID.

(C) Sample collection date.

(D) Sample type (field or matrix spike).

(E) Sample volume filtered (L), to nearest 1/4 L.

(F) Was 100% of filtered volume examined.

(G) Number of oocysts counted.

(H) For matrix spike samples, systems must also report the sample volume spiked and estimated number of oocysts spiked. These data are not required for field samples.

(I) For samples in which less than 10 L is filtered or less than 100% of the sample volume is examined, systems must also report the number of filters used and the packed pellet volume.

(J) For samples in which less than 100% of sample volume is examined, systems must also report the volume of resuspended concentrate and volume of this resuspension processed through immunomagnetic separation.

(ii) Systems must report the following data elements for each E. coli analysis:

(A) PWS ID.

(B) Facility ID.

(C) Sample collection date.

(D) Analytical method number.

(E) Method type.

(F) Source type (flowing stream, lake/reservoir, GWUDI).

(G) E. coli/100 mL.

(H) Turbidity. (Systems serving fewer than 10,000 people that are not required to monitor for turbidity under R309-215-15(2) are not required to report turbidity with their E. coli results.)

(8) Grandfathering previously collected data.

(a) (i) Systems may comply with the initial source water monitoring requirements of R309-215-15(2)(a) by grandfathering sample results collected before the system is required to begin monitoring (i.e., previously

collected data). To be grandfathered, the sample results and analysis must meet the criteria in this section and the Director must approve.

(ii) A filtered system may grandfather Cryptosporidium samples to meet the requirements of R309-215-15(2)(a) when the system does not have corresponding E. coli and turbidity samples. A system that grandfathers Cryptosporidium samples without E. coli and turbidity samples is not required to collect E. coli and turbidity samples when the system completes the requirements for Cryptosporidium monitoring under R309-215-15(2)(a).

(b) E. coli sample analysis. The analysis of E. coli samples must meet the analytical method and approved laboratory requirements of R309-215-15(5) through R309-215-15(6).

(c) Cryptosporidium sample analysis. The analysis of Cryptosporidium samples must meet the criteria in this paragraph.

(i) Laboratories analyzed Cryptosporidium samples using one of the analytical methods in paragraphs (c)(i)(A) through (D) of this section, which are incorporated by reference. You may obtain a copy of these methods on-line from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave, NW, Washington, DC 20460 (Telephone: 800-426-4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202-566-2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. You may also obtain a copy of these methods by contacting the Division of Drinking Water at 801-536-4200.

(A) Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/ FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-002.

(B) Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-001.

(C) Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/ FA, 2001, United States Environmental Protection Agency, EPA-821-R-01-025.

(D) Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 2001, United States Environmental Protection Agency, EPA-821-R-01-026.

(E) Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/ FA, 1999, United States Environmental Protection Agency, EPA-821-R-99-006.

(F) Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 1999, United States Environmental Protection Agency, EPA-821-R-99-001.

(ii) For each Cryptosporidium sample, the laboratory analyzed at least 10 L of sample or at least 2 mL of packed pellet or as much volume as could be filtered by 2 filters that EPA approved for the methods listed in paragraph (c)(1) of this section.

(d) Sampling location. The sampling location must meet the conditions in R309-215-15(4).

(e) Sampling frequency. Cryptosporidium samples were collected no less frequently than each calendar month on a regular schedule, beginning no earlier than January 1999. Sample collection intervals may vary for the conditions specified in R309-215-15(3)(b)(i) and (ii) if the system provides documentation of the condition when reporting monitoring results.

(i) The Director may approve grandfathering of previously collected data where there are time gaps in the sampling frequency if the system conducts additional monitoring the Director specifies to ensure that the data used to comply with the initial source water monitoring requirements of R309-215-15(2)(a) are seasonally representative and unbiased.

(ii) Systems may grandfather previously collected data where the sampling frequency within each month varied. If the Cryptosporidium sampling frequency varied, systems must follow the monthly averaging procedure in R309-215-15(11)(b)(v) when calculating the bin classification for filtered systems.

(f) Reporting monitoring results for grandfathering. Systems that request to grandfather previously collected monitoring results must report the following information by the applicable dates listed in this paragraph. Systems serving at least 10,000 people must report this information to EPA unless the Director approves reporting to the Director rather than EPA. Systems serving fewer than 10,000 people must report this information to the Director.

(i) Systems must report that they intend to submit previously collected monitoring results for grandfathering. This report must specify the number of previously collected results the system will submit, the dates of the first and last sample, and whether a system will conduct additional source water

monitoring to meet the requirements of R309-215-15(2)(a). Systems must report this information no later than the date the sampling schedule under R309-215-15(3) is required.

(ii) Systems must report previously collected monitoring results for grandfathering, along with the associated documentation listed in paragraphs (f)(ii)(A) through (D) of this section, no later than two months after the applicable date listed in R309-215-15(2)(c).

(A) For each sample result, systems must report the applicable data elements in R309-215-15(7).

(B) Systems must certify that the reported monitoring results include all results the system generated during the time period beginning with the first reported result and ending with the final reported result. This applies to samples that were collected from the sampling location specified for source water monitoring under this subpart, not spiked, and analyzed using the laboratory's routine process for the analytical methods listed in this section.

(C) Systems must certify that the samples were representative of a plant's source water(s) and the source water(s) have not changed. Systems must report a description of the sampling location(s), which must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including points of chemical addition and filter backwash recycle.

(D) For Cryptosporidium samples, the laboratory or laboratories that analyzed the samples must provide a letter certifying that the quality control criteria specified in the methods listed in paragraph (c)(i) of this section were met for each sample batch associated with the reported results. Alternatively, the laboratory may provide bench sheets and sample examination report forms for each field, matrix spike, IPR, OPR, and method blank sample associated with the reported results.

(g) If the Director determines that a previously collected data set submitted for grandfathering was generated during source water conditions that were not normal for the system, such as a drought, the Director may disapprove the data. Alternatively, the Director may approve the previously collected data if the system reports additional source water monitoring data, as determined by the Director, to ensure that the data set used under R309-215-15(11) represents average source water conditions for the system.

(h) If a system submits previously collected data that fully meet the number of samples required for initial source water monitoring under R309-215-15(2)(a) and

some of the data are rejected due to not meeting the requirements of this section, systems must conduct additional monitoring to replace rejected data on a schedule the Director approves. Systems are not required to begin this additional monitoring until two months after notification that data have been rejected and additional monitoring is necessary.

(9) Disinfection Profiling and Benchmarking Requirements –

Requirements when making a significant change in disinfection practice.

(a) Following the completion of initial source water monitoring under R309-215-15(2)(a), a system that plans to make a significant change to its disinfection practice, as defined in paragraph (b) of this section, must develop disinfection profiles and calculate disinfection benchmarks for Giardia lamblia and viruses as described in R309-215-15(10). Prior to changing the disinfection practice, the system must notify the Director and must include in this notice the information in paragraphs (a)(i) through (iii) of this section.

(i) A completed disinfection profile and disinfection benchmark for Giardia lamblia and viruses as described in R309-215-15(10).

(ii) A description of the proposed change in disinfection practice.

(iii) An analysis of how the proposed change will affect the current level of disinfection.

(b) Significant changes to disinfection practice are defined as follows:

(i) Changes to the point of disinfection;

(ii) Changes to the disinfectant(s) used in the treatment plant;

(iii) Changes to the disinfection process; or

(iv) Any other modification identified by the Director as a significant change to disinfection practice.

(10) Developing the disinfection profile and benchmark.

(a) Systems required to develop disinfection profiles under R309-215-15(9) must follow the requirements of this section. Systems must monitor at least weekly for a period of 12 consecutive months to determine the total log inactivation for Giardia lamblia and viruses. If systems monitor more frequently, the monitoring frequency must be evenly spaced. Systems that operate for fewer than 12 months per year must

monitor weekly during the period of operation. Systems must determine log inactivation for Giardia lamblia through the entire plant, based on $CT_{99.9}$ values in Tables 1.1 through 1.6, 2.1 and 3.1 of Section 141.74(b) in the code of Federal Regulations as applicable (available from the Division). Systems must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the Director.

(b) Systems with a single point of disinfectant application prior to the entrance to the distribution system must conduct the monitoring in paragraphs (b)(i) through (iv) of this section. Systems with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(i) through (iv) of this section for each disinfection segment. Systems must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in R309-200-4(3) and (4).

(i) For systems using a disinfectant other than UV, the temperature of the disinfected water must be measured at each residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the Director.

(ii) For systems using chlorine, the pH of the disinfected water must be measured at each chlorine residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the Director.

(iii) The disinfectant contact time(s) (t) must be determined during peak hourly flow.

(iv) The residual disinfectant concentration(s) (C) of the water before or at the first customer and prior to each additional point of disinfectant application must be measured during peak hourly flow.

(c) In lieu of conducting new monitoring under paragraph (b) of this section, systems may elect to meet the requirements of paragraphs (c)(i) or (ii) of this section.

(i) Systems that have at least one year of existing data that are substantially equivalent to data collected under the provisions of paragraph (b) of this section may use these data to develop disinfection profiles as specified in this section if the system has neither made a significant change to its treatment practice nor changed sources since the data were collected. Systems may develop disinfection profiles using up to three years of existing data.

(ii) Systems may use disinfection profile(s) developed under R309-215-14 in lieu of developing a new profile if the system has neither made a significant change to its treatment practice nor changed sources since the profile was developed. Systems that have not developed a virus profile under R309-251-

14 must develop a virus profile using the same monitoring data on which the Giardia lamblia profile is based.

(d) Systems must calculate the total inactivation ratio for Giardia lamblia as specified in paragraphs (d)(i) through (iii) of this section.

(i) Systems using only one point of disinfectant application may determine the total inactivation ratio for the disinfection segment based on either of the methods in paragraph (d)(1)(i) or (ii) of this section.

(A) Determine one inactivation ratio ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow.

(B) Determine successive $CTcalc/ CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. The system must calculate the total inactivation ratio by determining ($CTcalc/CT_{99.9}$) for each sequence and then adding the ($CTcalc/ CT_{99.9}$) values together to determine the sum of ($CTcalc/CT_{99.9}$).

(ii) Systems using more than one point of disinfectant application before the first customer must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The ($CTcalc/ CT_{99.9}$) value of each segment and the sum of ($CTcalc/CT_{99.9}$) must be calculated using the method in paragraph (d)(i)(B) of this section.

(iii) The system must determine the total logs of inactivation by multiplying the value calculated in paragraph (d)(i) or (d)(ii) of this section by 3.0.

(iv) Systems must calculate the log of inactivation for viruses using a protocol approved by the Director.

(e) Systems must use the procedures specified in paragraphs (e)(i) and (ii) of this section to calculate a disinfection benchmark.

(i) For each year of profiling data collected and calculated under paragraphs (a) through (d) of this section, systems must determine the lowest mean monthly level of both Giardia lamblia and virus inactivation. Systems must determine the mean Giardia lamblia and virus inactivation for each calendar month for each year of profiling data by dividing the sum of daily or weekly Giardia lamblia and virus log inactivation by the number of values calculated for that month.

(ii) The disinfection benchmark is the lowest monthly mean value (for systems with one year of profiling data) or the mean of the lowest monthly mean values (for systems with more than one year of profiling data) of Giardia lamblia and virus log inactivation in each year of profiling data.

(11) Treatment Technique Requirements - Bin classification for filtered systems.

(a) Following completion of the initial round of source water monitoring required under R309-215-15(2)(a), filtered systems must calculate an initial Cryptosporidium bin concentration for each plant for which monitoring was required. Calculation of the bin concentration must use the Cryptosporidium results reported under R309-215-15(2)(a) and must follow the procedures in paragraphs (b)(i) through (v) of this section.

(b) (i) For systems that collect a total of at least 48 samples, the bin concentration is equal to the arithmetic mean of all sample concentrations.

(ii) For systems that collect a total of at least 24 samples, but not more than 47 samples, the bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which Cryptosporidium samples were collected.

(iii) For systems that serve fewer than 10,000 people and monitor for Cryptosporidium for only one year (i.e., collect 24 samples in 12 months), the bin concentration is equal to the arithmetic mean of all sample concentrations.

(iv) For systems with plants operating only part of the year that monitor fewer than 12 months per year under R309-215-15(2)(e), the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of Cryptosporidium monitoring.

(v) If the monthly Cryptosporidium sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in paragraphs (b)(i) through (iv) of this section.

(c) Filtered systems must determine their initial bin classification from the following and using the Cryptosporidium bin concentration calculated under paragraphs (a) and (b) of this section:

(i) Systems that are required to monitor for Cryptosporidium under R309-215-15(2):

(A) with a cryptosporidium concentration of less than 0.075 oocyst/L, the bin classification is Bin 1.

(B) with a cryptosporidium concentration of 0.075 oocysts/L to less than 1.0 oocysts/L, the bin classification is Bin 2.

(C) with a cryptosporidium concentration of 1.0 oocysts/L to less than 3.0 oocysts/L, the bin classification is Bin 3.

(D) with a cryptosporidium concentration of equal to or greater than 3.0 oocysts/L, the bin classification is Bin 4.

(ii) Systems serving fewer than 10,000 people and not required to monitor for Cryptosporidium under R309-215-15(2)(a)(iii), the concentration of cryptosporidium is not applicable and their bin classification is Bin 1.

(iii) Based on calculations in paragraph (a) or (d) of this section, as applicable.

(d) Following completion of the second round of source water monitoring required under R309-215-15(2)(b), filtered systems must recalculate their Cryptosporidium bin concentration using the Cryptosporidium results reported under R309-215-15(2)(b) and following the procedures in paragraphs (b)(i) through (iv) of this section. Systems must then redetermine their bin classification using this bin concentration and the table in paragraph (c) of this section.

(e) (i) Filtered systems must report their initial bin classification under paragraph (c) of this section to the Director for approval no later than 6 months after the system is required to complete initial source water monitoring based on the schedule in R309-215-15(2)(c).

(ii) Systems must report their bin classification under paragraph (d) of this section to the Director for approval no later than 6 months after the system is required to complete the second round of source water monitoring based on the schedule in R309-215-15(2)(c).

(iii) The bin classification report to the Director must include a summary of source water monitoring data and the calculation procedure used to determine bin classification.

(f) Failure to comply with the conditions of paragraph (e) of this section is a violation of the treatment technique requirement.

(12) Filtered system additional Cryptosporidium treatment requirements.

(a) Filtered systems must provide the level of additional treatment for Cryptosporidium specified in this paragraph based on their bin classification as determined under R309-215-15(11) and according to the schedule in R309-215-15(13). The filtration treatment used by the system in this paragraph must be utilized in full compliance with the requirements of R309-200-5(5), R309-200-7, R309-215-8 and 9.

(i) If the system bin classification is Bin 1 and the system uses:

(A) Conventional filtration treatment including softening there is no additional cryptosporidium treatment required.

(B) Direct filtration there is no additional cryptosporidium treatment required.

(C) Slow sand or diatomaceous earth filtration there is no additional cryptosporidium treatment required.

(D) Alternative filtration technologies there is no additional cryptosporidium treatment required.

(ii) If the system bin classification is Bin 2 and the system uses:

(A) Conventional filtration treatment including softening there is an additional 1-log cryptosporidium treatment required.

(B) Direct filtration there is an additional 1.5-log cryptosporidium treatment required.

(C) Slow sand or diatomaceous earth filtration there is an additional 1-log cryptosporidium treatment required.

(D) Alternative filtration technologies there is an additional cryptosporidium treatment required as determined by the Director such that the total Cryptosporidium removal an inactivation is at least 4.0-log.

(iii) If the system bin classification is Bin 3 and the system uses:

(A) Conventional filtration treatment including softening there is an additional 2-log cryptosporidium treatment required.

(B) Direct filtration there is an additional 2.5-log cryptosporidium treatment required.

(C) Slow sand or diatomaceous earth filtration there is an additional 2-log cryptosporidium treatment required.

(D) Alternative filtration technologies there is an additional cryptosporidium treatment required as determined by the Director such that the total Cryptosporidium removal an inactivation is at least 5.0-log.

(iv) If the system bin classification is Bin 4 and the system uses:

(A) Conventional filtration treatment including softening there is an additional 2.5-log cryptosporidium treatment required.

(B) Direct filtration there is an additional 3-log cryptosporidium treatment required.

(C) Slow sand or diatomaceous earth filtration there is an additional 2.5-log cryptosporidium treatment required.

(D) Alternative filtration technologies there is an additional cryptosporidium treatment required as determined by the Director such that the total Cryptosporidium removal an inactivation is at least 5.5-log.

(b) (i) Filtered systems must use one or more of the treatment and management options listed in R309-215-15(14), termed the microbial toolbox, to comply with the additional Cryptosporidium treatment required in paragraph (a) of this section.

(ii) Systems classified in Bin 3 and Bin 4 must achieve at least 1-log of the additional Cryptosporidium treatment required under paragraph (a) of this section using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, or UV, as described in R309-215-15(15) through R309-215-15(19).

(c) Failure by a system in any month to achieve treatment credit by meeting criteria in R309-215-15(15) through R309-215-15(19) for microbial toolbox options that is at least equal to the level of treatment required in paragraph (a) of this section is a violation of the treatment technique requirement.

(d) If the Director determines during a sanitary survey or an equivalent source water assessment that after a system completed the monitoring conducted under R309-215-15(2)(a) or R309-215-15(2)(b), significant changes occurred in the system's

watershed that could lead to increased contamination of the source water by Cryptosporidium, the system must take actions specified by the Director to address the contamination. These actions may include additional source water monitoring and/or implementing microbial toolbox options listed in R309-215-15(14).

(13) Schedule for compliance with Cryptosporidium treatment requirements.

(a) Following initial bin classification under R309-215-15(11)(c), filtered systems must provide the level of treatment for Cryptosporidium required under R309-215-15(12) according to the schedule in paragraph (c) of this section.

(b) Cryptosporidium treatment compliance dates.

(i) Systems that serve at least 100,000 people must comply with Cryptosporidium treatment requirements no later than April 1, 2012.

(ii) Systems that serve from 50,000 to 99,999 people must comply with Cryptosporidium treatment requirements no later than October 1, 2012.

(iii) Systems that serve from 10,000 to 49,999 people must comply with Cryptosporidium treatment requirements no later than October 1, 2013.

(iv) Systems that serve less than 10,000 people must comply with Cryptosporidium treatment requirements no later than October 1, 2014.

(v) The Director may allow up to an additional two years for complying with the treatment requirement for systems making capital improvements.

(c) If the bin classification for a filtered system changes following the second round of source water monitoring, as determined under R309-215-15(11)(d), the system must provide the level of treatment for Cryptosporidium required under R309-215-15(12) on a schedule the Director approves.

(14) Microbial toolbox options for meeting Cryptosporidium treatment requirements.

(a) Systems receive the treatment credits listed in the table in paragraph (b) of this section by meeting the conditions for microbial toolbox options described in R309-215-15(15) through R309-215-15(19). Systems apply these treatment credits to meet the treatment requirements in R309-215-15(12).

(b) The following sub-section summarizes options in the microbial toolbox and the Cryptosporidium treatment credit with design and implementation criteria.

(i) Source Protection and Management Toolbox Options:

(A) Watershed control program: 0.5-log credit for Director-approved program comprising required elements, annual program status report to Director, and regular watershed survey. Specific criteria are in R309-215-15(15) (a).

(B) Alternative source/intake management: No prescribed credit. Systems may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies. Specific criteria are in R309-215-15(15) (b).

(ii) Pre Filtration Toolbox Options:

(A) Presedimentation basin with coagulation: 0.5-log credit during any month that presedimentation basins achieve a monthly mean reduction of 0.5-log or greater in turbidity or alternative Director-approved performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through basins. Specific criteria are in R309-215-15(16) (a).

(B) Two-stage lime softening: 0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages. All plant flow must pass through both stages. Single-stage softening is credited as equivalent to conventional treatment. Specific criteria are in R309-215-15(16) (b).

(C) Bank filtration: 0.5-log credit for 25-foot setback; 1.0-log credit for 50-foot setback; aquifer must be unconsolidated sand containing at least 10 percent fines; average turbidity in wells must be less than 1 NTU. Systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit. Specific criteria are in R309-215-15(16) (c).

(iii) Treatment Performance Toolbox Options:

(A) Combined filter performance: 0.5-log credit for combined filter effluent turbidity less than or equal to 0.15 NTU in at least 95 percent of measurements each month. Specific criteria are in R309-215-15(17) (a).

(B) Individual filter performance: 0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter and is never greater than 0.3 NTU in two consecutive measurements in any filter. Specific criteria are in R309-215-15(17) (b).

(C) Demonstration of performance: Credit awarded to unit process or treatment train based on a demonstration to the Director with a Director-approved protocol. Specific criteria are in R309-215-15(17) (c).

(iv) Additional Filtration Toolbox Options:

(A) Bag or cartridge filters (individual filters): Up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1.0-log factor of safety. Specific criteria are in R309-215-15(18) (a).

(B) Bag or cartridge filters (in series): Up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety. Specific criteria are in R309-215-15(18) (a).

(C) Membrane filtration: Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing. Specific criteria are in R309-215-15(18) (b).

(D) Second stage filtration: 0.5-log credit for second separate granular media filtration stage if treatment train includes coagulation prior to first filter. Specific criteria are in R309-215-15(18) (c).

(E) Slow sand filters: 2.5-log credit as a secondary filtration step; 3.0-log credit as a primary filtration process. No prior chlorination for either option. Specific criteria are in R309-215-15(18) (d).

(v) Inactivation Toolbox Options:

(A) Chlorine dioxide: Log credit based on measured CT in relation to CT table. Specific criteria in R309-215-15(19) (b).

(B) Ozone: Log credit based on measured CT in relation to CT table. Specific criteria in R309-215-15(19) (b).

(C) UV: Log credit based on validated UV dose in relation to UV dose table; reactor validation testing required to establish UV dose

and associated operating conditions. Specific criteria in R309-215-15(19) (d).

(15) Source toolbox components.

(a) Watershed control program. Systems receive 0.5-log Cryptosporidium treatment credit for implementing a watershed control program that meets the requirements of this section.

(i) Systems that intend to apply for the watershed control program credit must notify the Director of this intent no later than two years prior to the treatment compliance date applicable to the system in R309-215-15(13).

(ii) Systems must submit to the Director a proposed watershed control plan no later than one year before the applicable treatment compliance date in R309-215-15(13). The Director must approve the watershed control plan for the system to receive watershed control program treatment credit. The watershed control plan must include the elements in paragraphs (a)(ii)(A) through (D) of this section.

(A) Identification of an "area of influence" outside of which the likelihood of Cryptosporidium or fecal contamination affecting the treatment plant intake is not significant. This is the area to be evaluated in future watershed surveys under paragraph (a)(v)(B) of this section.

(B) Identification of both potential and actual sources of Cryptosporidium contamination and an assessment of the relative impact of these sources on the system's source water quality.

(C) An analysis of the effectiveness and feasibility of control measures that could reduce Cryptosporidium loading from sources of contamination to the system's source water.

(D) A statement of goals and specific actions the system will undertake to reduce source water Cryptosporidium levels. The plan must explain how the actions are expected to contribute to specific goals, identify watershed partners and their roles, identify resource requirements and commitments, and include a schedule for plan implementation with deadlines for completing specific actions identified in the plan.

(iii) Systems with existing watershed control programs (i.e., programs in place on January 5, 2006) are eligible to seek this credit. Their watershed control plans must meet the criteria in paragraph (a)(ii) of this section and

must specify ongoing and future actions that will reduce source water Cryptosporidium levels.

(iv) If the Director does not respond to a system regarding approval of a watershed control plan submitted under this section and the system meets the other requirements of this section, the watershed control program will be considered approved and 0.5 log Cryptosporidium treatment credit will be awarded unless and until the Director subsequently withdraws such approval.

(v) Systems must complete the actions in paragraphs (a)(v)(A) through (C) of this section to maintain the 0.5-log credit.

(A) Submit an annual watershed control program status report to the Director. The annual watershed control program status report must describe the system's implementation of the approved plan and assess the adequacy of the plan to meet its goals. It must explain how the system is addressing any shortcomings in plan implementation, including those previously identified by the Director or as the result of the watershed survey conducted under paragraph (a)(v)(B) of this section. It must also describe any significant changes that have occurred in the watershed since the last watershed sanitary survey. If a system determines during implementation that making a significant change to its approved watershed control program is necessary, the system must notify the Director prior to making any such changes. If any change is likely to reduce the level of source water protection, the system must also list in its notification the actions the system will take to mitigate this effect.

(B) Undergo a watershed sanitary survey every three years for community water systems and every five years for non-community water systems and submit the survey report to the Director. The survey must be conducted according to State guidelines and by persons the Director approves.

(I) The watershed sanitary survey must meet the following criteria: encompass the region identified in the Director-approved watershed control plan as the area of influence; assess the implementation of actions to reduce source water Cryptosporidium levels; and identify any significant new sources of Cryptosporidium.

(II) If the Director determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, systems must undergo another watershed sanitary survey by a date the Director requires, which may be

earlier than the regular date in paragraph (a)(v)(B) of this section.

(C) The system must make the watershed control plan, annual status reports, and watershed sanitary survey reports available to the public upon request. These documents must be in a plain language style and include criteria by which to evaluate the success of the program in achieving plan goals. The Director may approve systems to withhold from the public portions of the annual status report, watershed control plan, and watershed sanitary survey based on water supply security considerations.

(vi) If the Director determines that a system is not carrying out the approved watershed control plan, the Director may withdraw the watershed control program treatment credit.

(b) Alternative source. (i) A system may conduct source water monitoring that reflects a different intake location (either in the same source or for an alternate source) or a different procedure for the timing or level of withdrawal from the source (alternative source monitoring). If the Director approves, a system may determine its bin classification under R309-215-15(11) based on the alternative source monitoring results.

(ii) If systems conduct alternative source monitoring under paragraph (b)(i) of this section, systems must also monitor their current plant intake concurrently as described in R309-215-15(2).

(iii) Alternative source monitoring under paragraph (b)(i) of this section must meet the requirements for source monitoring to determine bin classification, as described in R309-215-15(2) through R309-215-15(7). Systems must report the alternative source monitoring results to the Director, along with supporting information documenting the operating conditions under which the samples were collected.

(iv) If a system determines its bin classification under R309-215-15(11) using alternative source monitoring results that reflect a different intake location or a different procedure for managing the timing or level of withdrawal from the source, the system must relocate the intake or permanently adopt the withdrawal procedure, as applicable, no later than the applicable treatment compliance date in R309-215-15(13).

(16) Pre-filtration treatment toolbox components.

(a) Presedimentation. Systems receive 0.5-log Cryptosporidium treatment credit for a presedimentation basin during any month the process meets the criteria in this paragraph.

(i) The presedimentation basin must be in continuous operation and must treat the entire plant flow taken from a surface water or GWUDI source.

(ii) The system must continuously add a coagulant to the presedimentation basin.

(iii) The presedimentation basin must achieve the performance criteria in paragraph (iii)(A) or (B) of this section.

(A) Demonstrates at least 0.5-log mean reduction of influent turbidity. This reduction must be determined using daily turbidity measurements in the presedimentation process influent and effluent and must be calculated as follows: log10(monthly mean of daily influent turbidity) minus log10(monthly mean of daily effluent turbidity).

(B) Complies with Director-approved performance criteria that demonstrate at least 0.5-log mean removal of micron-sized particulate material through the presedimentation process.

(b) Two-stage lime softening. Systems receive an additional 0.5-log Cryptosporidium treatment credit for a two-stage lime softening plant if chemical addition and hardness precipitation occur in two separate and sequential softening stages prior to filtration. Both softening stages must treat the entire plant flow taken from a surface water or GWUDI source.

(c) Bank filtration. Systems receive Cryptosporidium treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting the criteria in this paragraph. Systems using bank filtration when they begin source water monitoring under R309-215-15(2)(a) must collect samples as described in R309-215-15(4)(d) and are not eligible for this credit.

(i) Wells with a ground water flow path of at least 25 feet receive 0.5-log treatment credit; wells with a ground water flow path of at least 50 feet receive 1.0-log treatment credit. The ground water flow path must be determined as specified in paragraph (c)(iv) of this section.

(ii) Only wells in granular aquifers are eligible for treatment credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. A system must characterize the aquifer at the well site to determine aquifer properties. Systems must extract a core from the aquifer and demonstrate that in at least 90 percent of the core

length, grains less than 1.0 mm in diameter constitute at least 10 percent of the core material.

(iii) Only horizontal and vertical wells are eligible for treatment credit.

(iv) For vertical wells, the ground water flow path is the measured distance from the edge of the surface water body under high flow conditions (determined by the 100 year floodplain elevation boundary or by the floodway, as defined in Federal Emergency Management Agency flood hazard maps) to the well screen. For horizontal wells, the ground water flow path is the measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral screen.

(v) Systems must monitor each wellhead for turbidity at least once every four hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed 1 NTU, the system must report this result to the Director and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the Director determines that microbial removal has been compromised, the Director may revoke treatment credit until the system implements corrective actions approved by the Director to remediate the problem.

(vi) Springs and infiltration galleries are not eligible for treatment credit under this section, but are eligible for credit under R309-215-15(17)(c).

(vii) Bank filtration demonstration of performance. The Director may approve Cryptosporidium treatment credit for bank filtration based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than 1.0-log and may be awarded to bank filtration that does not meet the criteria in paragraphs (c)(i)-(v) of this section.

(A) The study must follow a Director-approved protocol and must involve the collection of data on the removal of Cryptosporidium or a surrogate for Cryptosporidium and related hydrogeologic and water quality parameters during the full range of operating conditions.

(B) The study must include sampling both from the production well(s) and from monitoring wells that are screened and located along the shortest flow path between the surface water source and the production well(s).

(17) Treatment performance toolbox components.

(a) Combined filter performance. Systems using conventional filtration treatment or direct filtration treatment receive an additional 0.5-log Cryptosporidium treatment credit during any month the system meets the criteria in this paragraph. Combined filter effluent (CFE) turbidity must be less than or equal to 0.15 NTU in at least 95 percent of the measurements. Turbidity must be measured as described in R309-200-4(3) and (4).

(b) Individual filter performance. Systems using conventional filtration treatment or direct filtration treatment receive 0.5-log Cryptosporidium treatment credit, which can be in addition to the 0.5-log credit under paragraph (a) of this section, during any month the system meets the criteria in this paragraph. Compliance with these criteria must be based on individual filter turbidity monitoring as described in R309-215-9(4) or (5), as applicable.

(i) The filtered water turbidity for each individual filter must be less than or equal to 0.15 NTU in at least 95 percent of the measurements recorded each month.

(ii) No individual filter may have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.

(iii) Any system that has received treatment credit for individual filter performance and fails to meet the requirements of paragraph (b)(i) or (ii) of this section during any month does not receive a treatment technique violation under R309-215-15(12)(c) if the Director determines the following:

(A) The failure was due to unusual and short-term circumstances that could not reasonably be prevented through optimizing treatment plant design, operation, and maintenance.

(B) The system has experienced no more than two such failures in any calendar year.

(c) Demonstration of performance. The Director may approve Cryptosporidium treatment credit for drinking water treatment processes based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than or less than the prescribed treatment credits in R309-215-15(12) or R309-215-15(16) through R309-215-15(19) and may be awarded to treatment processes that do not meet the criteria for the prescribed credits.

(i) Systems cannot receive the prescribed treatment credit for any toolbox box option in R309-215-15(16) through R309-215-15(19) if that toolbox option is included in a demonstration of performance study for which treatment credit is awarded under this paragraph.

(ii) The demonstration of performance study must follow a Director-approved protocol and must demonstrate the level of Cryptosporidium reduction the treatment process will achieve under the full range of expected operating conditions for the system.

(iii) Approval by the Director must be in writing and may include monitoring and treatment performance criteria that the system must demonstrate and report on an ongoing basis to remain eligible for the treatment credit. The Director may designate such criteria where necessary to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.

(18) Additional filtration toolbox components.

(a) Bag and cartridge filters. Systems receive Cryptosporidium treatment credit of up to 2.0-log for individual bag or cartridge filters and up to 2.5-log for bag or cartridge filters operated in series by meeting the criteria in paragraphs (a)(i) through (x) of this section. To be eligible for this credit, systems must report the results of challenge testing that meets the requirements of paragraphs (a)(ii) through (ix) of this section to the Director. The filters must treat the entire plant flow taken from a surface water source.

(i) The Cryptosporidium treatment credit awarded to bag or cartridge filters must be based on the removal efficiency demonstrated during challenge testing that is conducted according to the criteria in paragraphs (a)(ii) through (a)(ix) of this section. A factor of safety equal to 1-log for individual bag or cartridge filters and 0.5-log for bag or cartridge filters in series must be applied to challenge testing results to determine removal credit. Systems may use results from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria specified in paragraphs (a)(ii) through (ix) of this section.

(ii) Challenge testing must be performed on full-scale bag or cartridge filters, and the associated filter housing or pressure vessel, that are identical in material and construction to the filters and housings the system will use for removal of Cryptosporidium. Bag or cartridge filters must be challenge tested in the same configuration that the system will use, either as individual filters or as a series configuration of filters.

(iii) Challenge testing must be conducted using Cryptosporidium or a surrogate that is removed no more efficiently than Cryptosporidium. The microorganism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate must be determined using a method capable of discreetly quantifying the specific

microorganism or surrogate used in the test; gross measurements such as turbidity may not be used.

(iv) The maximum feed water concentration that can be used during a challenge test must be based on the detection limit of the challenge particulate in the filtrate (i.e., filtrate detection limit) and must be calculated using the following equation: Maximum Feed Concentration = $1 \times 10^4 \times$ (Filtrate Detection Limit).

(v) Challenge testing must be conducted at the maximum design flow rate for the filter as specified by the manufacturer.

(vi) Each filter evaluated must be tested for a duration sufficient to reach 100 percent of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with the requirements of this subpart.

(vii) Removal efficiency of a filter must be determined from the results of the challenge test and expressed in terms of log removal values using the following equation: $LRV = LOG_{10}(C_f)-LOG_{10}(C_p)$ Where: LRV = log removal value demonstrated during challenge testing; C_f = the feed concentration measured during the challenge test; and C_p = the filtrate concentration measured during the challenge test. In applying this equation, the same units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, then the term C_p must be set equal to the detection limit.

(viii) Each filter tested must be challenged with the challenge particulate during three periods over the filtration cycle: within two hours of start-up of a new filter; when the pressure drop is between 45 and 55 percent of the terminal pressure drop; and at the end of the cycle after the pressure drop has reached 100 percent of the terminal pressure drop. An LRV must be calculated for each of these challenge periods for each filter tested. The LRV for the filter (LRV_{filter}) must be assigned the value of the minimum LRV observed during the three challenge periods for that filter.

(ix) If fewer than 20 filters are tested, the overall removal efficiency for the filter product line must be set equal to the lowest LRV_{filter} among the filters tested. If 20 or more filters are tested, the overall removal efficiency for the filter product line must be set equal to the 10th percentile of the set of LRV_{filter} values for the various filters tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

(x) If a previously tested filter is modified in a manner that could change the removal efficiency of the filter product line, challenge testing to demonstrate the removal efficiency of the modified filter must be conducted and submitted to the Director.

(b) Membrane filtration.

(i) Systems receive Cryptosporidium treatment credit for membrane filtration that meets the criteria of this paragraph. Membrane cartridge filters that meet the definition of membrane filtration in R309-110 are eligible for this credit. The level of treatment credit a system receives is equal to the lower of the values determined under paragraph (b)(i)(A) and (B) of this section.

(A) The removal efficiency demonstrated during challenge testing conducted under the conditions in paragraph (b)(ii) of this section.

(B) The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process under the conditions in paragraph (b)(iii) of this section.

(ii) Challenge Testing. The membrane used by the system must undergo challenge testing to evaluate removal efficiency, and the system must report the results of challenge testing to the Director. Challenge testing must be conducted according to the criteria in paragraphs (b)(ii)(A) through (G) of this section. Systems may use data from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria in paragraphs (b)(ii)(A) through (G) of this section.

(A) Challenge testing must be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the system's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module. A module is defined as the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

(B) Challenge testing must be conducted using Cryptosporidium oocysts or a surrogate that is removed no more efficiently than Cryptosporidium oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate, in both the feed and filtrate water, must be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.

(C) The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and must be determined according to the following equation: Maximum Feed Concentration = $3.16 \times 10^6 \times$ (Filtrate Detection Limit).

(D) Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacturer for the membrane module. Flux is defined as the throughput of a pressure driven membrane process expressed as flow per unit of membrane area. Recovery is defined as the volumetric percent of feed water that is converted to filtrate over the course of an operating cycle uninterrupted by events such as chemical cleaning or a solids removal process (i.e., backwashing).

(E) Removal efficiency of a membrane module must be calculated from the challenge test results and expressed as a log removal value according to the following equation: $LRV = LOG_{10}(C_f) - LOG_{10}(C_p)$ Where: LRV = log removal value demonstrated during the challenge test; C_f = the feed concentration measured during the challenge test; and C_p = the filtrate concentration measured during the challenge test. Equivalent units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, the term C_p is set equal to the detection limit for the purpose of calculating the LRV. An LRV must be calculated for each membrane module evaluated during the challenge test.

(F) The removal efficiency of a membrane filtration process demonstrated during challenge testing must be expressed as a log removal value ($LRV_{C\text{-}Test}$). If fewer than 20 modules are tested, then $LRV_{C\text{-}Test}$ is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then $LRV_{C\text{-}Test}$ is equal to the 10th percentile of the representative LRVs among the modules tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

(G) The challenge test must establish a quality control release value (QCRV) for a non-destructive performance test that demonstrates the Cryptosporidium removal capability of the membrane filtration module. This performance test must be applied to each production membrane module used by the system that was not directly challenge tested in order to verify Cryptosporidium removal capability. Production modules that do not meet the established QCRV are not

eligible for the treatment credit demonstrated during the challenge test.

(H) If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the non-destructive performance test and associated QCRV, additional challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the Director.

(iii) Direct integrity testing. Systems must conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process and meets the requirements described in paragraphs (b)(iii)(A) through (F) of this section. A direct integrity test is defined as a physical test applied to a membrane unit in order to identify and isolate integrity breaches (i.e., one or more leaks that could result in contamination of the filtrate).

(A) The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.

(B) The direct integrity method must have a resolution of 3 micrometers or less, where resolution is defined as the size of the smallest integrity breach that contributes to a response from the direct integrity test.

(C) The direct integrity test must have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the Director, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity must be determined using the approach in either paragraph (b)(iii)(C)(I) or (II) of this section as applicable to the type of direct integrity test the system uses.

(I) For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity must be calculated according to the following equation: LRVDIT = LOG10 (Qp /(VCF x Qbreach)) Where: LRVDIT = the sensitivity of the direct integrity test; Qp = total design filtrate flow from the membrane unit; Qbreach = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured, and VCF = volumetric concentration factor. The volumetric concentration factor is

the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.

(II) For direct integrity tests that use a particulate or molecular marker, the direct integrity test sensitivity must be calculated according to the following equation: LRVDIT = LOG10(Cf)-LOG10(Cp) Where: LRVDIT = the sensitivity of the direct integrity test; Cf = the typical feed concentration of the marker used in the test; and Cp = the filtrate concentration of the marker from an integral membrane unit.

(D) Systems must establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the Director.

(E) If the result of a direct integrity test exceeds the control limit established under paragraph (b)(iii)(D) of this section, the system must remove the membrane unit from service. Systems must conduct a direct integrity test to verify any repairs, and may return the membrane unit to service only if the direct integrity test is within the established control limit.

(F) Systems must conduct direct integrity testing on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation. The Director may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for Cryptosporidium, or reliable process safeguards.

(iv) Indirect integrity monitoring. Systems must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in paragraphs (b)(iv)(A) through (E) of this section. Indirect integrity monitoring is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A system that implements continuous direct integrity testing of membrane units in accordance with the criteria in paragraphs (b)(iii)(A) through (E) of this section is not subject to the requirements for continuous indirect integrity monitoring. Systems must submit a monthly report to the Director summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken in each case.

(A) Unless the Director approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.

(B) Continuous monitoring must be conducted at a frequency of no less than once every 15 minutes.

(C) Continuous monitoring must be separately conducted on each membrane unit.

(D) If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (i.e., two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit as specified in paragraphs (b)(iii)(A) through (E) of this section.

(E) If indirect integrity monitoring includes a Director-approved alternative parameter and if the alternative parameter exceeds a Director-approved control limit for a period greater than 15 minutes, direct integrity testing must immediately be performed on the associated membrane units as specified in paragraphs (b)(iii)(A) through (E) of this section.

(c) Second stage filtration. Systems receive 0.5-log Cryptosporidium treatment credit for a separate second stage of filtration that consists of sand, dual media, GAC, or other fine grain media following granular media filtration if the Director approves. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat the entire plant flow taken from a surface water or GWUDI source. A cap, such as GAC, on a single stage of filtration is not eligible for this credit. The Director must approve the treatment credit based on an assessment of the design characteristics of the filtration process.

(d) Slow sand filtration (as secondary filter). Systems are eligible to receive 2.5-log Cryptosporidium treatment credit for a slow sand filtration process that follows a separate stage of filtration if both filtration stages treat entire plant flow taken from a surface water or GWUDI source and no disinfectant residual is present in the influent water to the slow sand filtration process. The Director must approve the treatment credit based on an assessment of the design characteristics of the filtration process. This paragraph does not apply to treatment credit awarded to slow sand filtration used as a primary filtration process.

(19) Inactivation toolbox components.

(a) Calculation of CT values. (i) CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Systems with treatment credit for chlorine dioxide or ozone under paragraph (b) or (c) of this section must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in R309-200-4(3) and (4).

(ii) Systems with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Under this approach, systems must add the Cryptosporidium CT values in each segment to determine the total CT for the treatment plant.

(b) CT values for chlorine dioxide and ozone. (i) Systems receive the Cryptosporidium treatment credit listed in this paragraph by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in paragraph (a) of this section.

(i) CT values ((MG)(MIN)/L) for Cryptosporidium inactivation by Chlorine Dioxide listed by the log credit with inactivation listed by water temperature in degrees Celsius.

(A) 0.25 Log Credit:

(I) less than or equal to 0.5 degrees: 159;

(II) 1 degree: 153;

(III) 2 degrees: 140;

(IV) 3 degrees: 128;

(V) 5 degrees: 107;

(VI) 7 degrees: 90;

(VII) 10 degrees: 69;

(VIII) 15 degrees: 45;

(IX) 20 degrees: 29;

(X) 25 degrees: 19; and

(XI) 30 degrees: 12.

(B) 0.5 Log Credit:

(I) less than or equal to 0.5 degrees: 319;

(II) 1 degree: 305;

(III) 2 degrees: 279;

(IV) 3 degrees: 256;

(V) 5 degrees: 214;

(VI) 7 degrees: 180;

(VII) 10 degrees: 138;

(VIII) 15 degrees: 89;

(IX) 20 degrees: 58;

(X) 25 degrees: 38; and

(XI) 30 degrees: 24.

(C) 1.0 Log Credit:

(I) less than or equal to 0.5 degrees: 637;

(II) 1 degree: 610;

(III) 2 degrees: 558;

(IV) 3 degrees: 511;

(V) 5 degrees: 429;

(VI) 7 degrees: 360;

(VII) 10 degrees: 277;

(VIII) 15 degrees: 179;

(IX) 20 degrees: 116;

(X) 25 degrees: 75; and

(XI) 30 degrees: 49.

(D) 1.5 Log Credit:

(I) less than or equal to 0.5 degrees: 956;

(II) 1 degree: 915;

(III) 2 degrees: 838;

(IV) 3 degrees: 767;

(V) 5 degrees: 643;

(VI) 7 degrees: 539;

(VII) 10 degrees: 415;

(VIII) 15 degrees: 268;

(IX) 20 degrees: 174;

(X) 25 degrees: 113; and

(XI) 30 degrees: 73.

(E) 2.0 Log Credit:

(I) less than or equal to 0.5 degrees: 1275;

(II) 1 degree: 1220;

(III) 2 degrees: 1117;

(IV) 3 degrees: 1023;

(V) 5 degrees: 858;

(VI) 7 degrees: 719;

(VII) 10 degrees: 553;

(VIII) 15 degrees: 357;

(IX) 20 degrees: 232;

(X) 25 degrees: 150; and

(XI) 30 degrees: 98.

(F) 2.5 Log Credit:

(I) less than or equal to 0.5 degrees: 1594;

(II) 1 degree: 1525;

(III) 2 degrees: 1396;

(IV) 3 degrees: 1278;

(V) 5 degrees: 1072;

(VI) 7 degrees: 899;

(VII) 10 degrees: 691;

(VIII) 15 degrees: 447;

(IX) 20 degrees: 289;

(X) 25 degrees: 188; and

(XI) 30 degrees: 122.

(G) 3.0 Log Credit:

(I) less than or equal to 0.5 degrees: 1912;

(II) 1 degree: 1830;

(III) 2 degrees: 1675;

(IV) 3 degrees: 1534;

(V) 5 degrees: 1286;

(VI) 7 degrees: 1079;

(VII) 10 degrees: 830;

(VIII) 15 degrees: 536;

(IX) 20 degrees: 347;

(X) 25 degrees: 226; and

(XI) 30 degrees: 147.

(F) Systems may use this equation to determine log credit between the indicated values above: Log credit = $(0.001506 \times (1.09116)^{Temp}) \times CT$.

(ii) Systems receive the Cryptosporidium treatment credit listed in this paragraph by meeting the corresponding ozone CT values for the applicable water temperature, as described in paragraph (a) of this section. CT values ((MG)(MIN)/L) for Cryptosporidium inactivation by Ozone listed by the log credit with inactivation listed by water temperature in degrees Celsius.

(A) 0.25 Log Credit:

(I) less than or equal to 0.5 degrees: 6.0;

(II) 1 degree: 5.8;

(III) 2 degrees: 5.2;

(IV) 3 degrees: 4.8;

(V) 5 degrees: 4.0;

(VI) 7 degrees: 3.3;

(VII) 10 degrees: 2.5;

(VIII) 15 degrees: 1.6;

(IX) 20 degrees: 1.0;

(X) 25 degrees: 0.6; and

(XI) 30 degrees: 0.39.

(B) 0.5 Log Credit:

(I) less than or equal to 0.5 degrees: 12;

(II) 1 degree: 12;

(III) 2 degrees: 10;

(IV) 3 degrees: 9.5;

(V) 5 degrees: 7.9;

(VI) 7 degrees: 6.5;

(VII) 10 degrees: 4.9;

(VIII) 15 degrees: 3.1;

(IX) 20 degrees: 2.0;

(X) 25 degrees: 1.2; and

(XI) 30 degrees: 0.78.

(C) 1.0 Log Credit:

(I) less than or equal to 0.5 degrees: 24;

(II) 1 degree: 23;

(III) 2 degrees: 21;

(IV) 3 degrees: 19;

(V) 5 degrees: 16;

(VI) 7 degrees: 13;

(VII) 10 degrees: 9.9;

(VIII) 15 degrees: 6.2;

(IX) 20 degrees: 3.9;

(X) 25 degrees: 2.5; and

(XI) 30 degrees: 1.6.

(D) 1.5 Log Credit:

(I) less than or equal to 0.5 degrees: 36;

(II) 1 degree: 35;

(III) 2 degrees: 31;

(IV) 3 degrees: 29;

(V) 5 degrees: 24;

(VI) 7 degrees: 20;

(VII) 10 degrees: 15;

(VIII) 15 degrees: 9.3;

(IX) 20 degrees: 5.9;

(X) 25 degrees: 3.7; and

(XI) 30 degrees: 2.4.

(E) 2.0 Log Credit:

(I) less than or equal to 0.5 degrees: 48;

(II) 1 degree: 46;

(III) 2 degrees: 42;

(IV) 3 degrees: 38;

(V) 5 degrees: 32;

(VI) 7 degrees: 26;

(VII) 10 degrees: 20;

(VIII) 15 degrees: 12;

(IX) 20 degrees: 7.8;

(X) 25 degrees: 4.9; and

(XI) 30 degrees: 3.1.

(F) 2.5 Log Credit:

(I) less than or equal to 0.5 degrees: 60;

(II) 1 degree: 58;

(III) 2 degrees: 52;

(IV) 3 degrees: 48;

(V) 5 degrees: 40;

(VI) 7 degrees: 33;

(VII) 10 degrees: 25;

(VIII) 15 degrees: 16;

(IX) 20 degrees: 9.8;

(X) 25 degrees: 6.2; and

(XI) 30 degrees: 3.9.

(G) 3.0 Log Credit:

(I) less than or equal to 0.5 degrees: 72;

(II) 1 degree: 69;

(III) 2 degrees: 63;

(IV) 3 degrees: 57;

(V) 5 degrees: 47;

(VI) 7 degrees: 39;

(VII) 10 degrees: 30;

(VIII) 15 degrees: 19;

(IX) 20 degrees: 12;

(X) 25 degrees: 7.4; and

(XI) 30 degrees: 4.7.

(F) Systems may use this equation to determine log credit between the indicated values: Log credit = $(0.0397 \times (1.09757)^{Temp}) \times CT$.

(c) Site-specific study. The Director may approve alternative chlorine dioxide or ozone CT values to those listed in paragraph (b) above on a site-specific basis. The

Director must base this approval on a site-specific study a system conducts that follows a protocol approved by the Director.

(d) Ultraviolet light. Systems receive Cryptosporidium, Giardia lamblia, and virus treatment credits for ultraviolet (UV) light reactors by achieving the corresponding UV dose values shown in paragraph (d)(i) of this section. Systems must validate and monitor UV reactors as described in paragraph (d)(ii) and (iii) of this section to demonstrate that they are achieving a particular UV dose value for treatment credit.

(i) UV dose table. The treatment credits listed in Table 215-5 are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. To receive treatment credit for other lamp types, systems must demonstrate an equivalent germicidal dose through reactor validation testing, as described in paragraph (d)(ii). The UV dose values in Table 215-5 are applicable only to post-filter applications of UV in filtered systems.

TABLE 215-5

UV Dose Table for Cryptosporidium, Giardia lamblia, and Virus Inactivation Credit

Log credit	Cryptosporidium UV dose (mJ/cm2)	Giardia lamblia UV dose (mJ/cm2)	Virus UV dose (mJ/cm2)
0.5	1.6	1.5	39
1.0	2.5	2.1	58
1.5	3.9	3.0	79
2.0	5.8	5.2	100
2.5	8.5	7.7	121
3.0	12	11	143
3.5	15	15	163
4.0	22	22	186

(ii) Reactor validation testing. Systems must use UV reactors that have undergone validation testing to determine the operating conditions under which the reactor delivers the UV dose required in paragraph (d)(i) of this section (i.e., validated operating conditions). These operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status.

(A) When determining validated operating conditions, systems must account for the following factors: UV absorbance of the water; lamp fouling and aging; measurement uncertainty of on-line sensors; UV dose distributions arising from the velocity profiles through the reactor; failure of UV lamps or other critical system components; and inlet and outlet piping or channel configurations of the UV reactor.

(B) Validation testing must include the following: Full scale testing of a reactor that conforms uniformly to the UV reactors used by the system and inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

(C) The Director may approve an alternative approach to validation testing.

(iii) Reactor monitoring.

(A) Systems must monitor their UV reactors to determine if the reactors are operating within validated conditions, as determined under paragraph (d)(ii) of this section. This monitoring must include UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters the Director designates based on UV reactor operation. Systems must verify the calibration of UV sensors and must recalibrate sensors in accordance with a protocol the Director approves.

(B) To receive treatment credit for UV light, systems must treat at least 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose, as described in paragraphs (d)(i) and (ii) of this section. Systems must demonstrate compliance with this condition by the monitoring required under paragraph (d)(iii)(A) of this section.

(20) Reporting requirements.

(a) Systems must report sampling schedules under R309-215-15(3) and source water monitoring results under R309-215-15(7) unless they notify the Director that they will not conduct source water monitoring due to meeting the criteria of R309-215-15(2)(d).

(b) Filtered systems must report their Cryptosporidium bin classification as described in R309-215-15(11).

(c) Systems must report disinfection profiles and benchmarks to the Director as described in R309-215-15(9) through R309-215-15(10) prior to making a significant change in disinfection practice.

(d) Systems must report to the Director in accordance with the following information on the following schedule for any microbial toolbox options used to comply with treatment requirements under R309-215-15(12). Alternatively, the Director may

approve a system to certify operation within required parameters for treatment credit rather than reporting monthly operational data for toolbox options.

(i) Watershed control program (WCP).

(A) Notice of intention to develop a new or continue an existing watershed control program no later than two years before the applicable treatment compliance date in R309-215-15(13).

(B) Watershed control plan no later than one year before the applicable treatment compliance date in R309-215-15(13).

(C) Annual watershed control program status report every 12 months, beginning one year after the applicable treatment compliance date in R309-215-15(13).

(D) Watershed sanitary survey report:

(I) For community water systems, every three years beginning three years after the applicable treatment compliance date in R309-215-15(13).

(II) For noncommunity water systems, every five years beginning five years after the applicable treatment compliance date in R309-215-15(13).

(ii) Alternative source/intake management:

(A) Verification that system has relocated the intake or adopted the intake withdrawal procedure reflected in monitoring results No later than the applicable treatment compliance date in R309-215-15(13).

(iii) Presedimentation: Monthly verification of the following:

(A) Continuous basin operation

(B) Treatment of 100% of the flow

(C) Continuous addition of a coagulant

(D) At least 0.5-log mean reduction of influent turbidity or compliance with alternative Director-approved performance criteria.

(E) Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(iv) Two-stage lime softening: Monthly verification of the following:

(A) Chemical addition and hardness precipitation occurred in two separate and sequential softening stages prior to filtration.

(B) Both stages treated 100% of the plant flow.

(C) Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(v) Bank filtration:

(A) Initial demonstration of the following no later than the applicable treatment compliance date in R309-215-15(13).

(I) Unconsolidated, predominantly sandy aquifer

(II) Setback distance of at least 25 ft. (0.5-log credit) or 50 ft. (1.0-log credit).

(B) If monthly average of daily max turbidity is greater than 1 NTU then system must report result and submit an assessment of the cause. The report is due within 30 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(vi) Combined filter performance:

(A) Monthly verification of combined filter effluent (CFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the 4 hour CFE measurements taken each month.

(B) Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(vii) Individual filter performance. Monthly verification of the following:

(A) Individual filter effluent (IFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter.

(B) No individual filter greater than 0.3 NTU in two consecutive readings 15 minutes apart.

(C) Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(viii) Demonstration of performance.

(A) Results from testing following a Director approved protocol no later than the applicable treatment compliance date in R309-215-15(13).

(B) As required by the Director, monthly verification of operation within conditions of Director approval for demonstration of performance credit within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(ix) Bag filters and cartridge filters.

(A) Demonstration that the following criteria are met no later than the applicable treatment compliance date in R309-215-15(13).

(I) Process meets the definition of bag or cartridge filtration;

(II) Removal efficiency established through challenge testing that meets criteria in this subpart.

(B) Monthly verification that 100% of plant flow was filtered within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(x) Membrane filtration.

(A) Results of verification testing demonstrating the following no later than the applicable treatment compliance date in R309-215-15(13).

(I) Removal efficiency established through challenge testing that meets criteria in this subpart;

(II) Integrity test method and parameters, including resolution, sensitivity, test frequency, control limits, and associated baseline.

(B) Monthly report summarizing the following within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(I) All direct integrity tests above the control limit;

(II) If applicable, any turbidity or alternative Director-approved indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken.

(xi) Second stage filtration: Monthly verification that 100% of flow was filtered through both stages and that first stage was preceded by coagulation step within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(xii) Slow sand filtration (as secondary filter): Monthly verification that both a slow sand filter and a preceding separate stage of filtration treated 100% of flow from surface water sources within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(xiii) Chlorine dioxide: Summary of CT values for each day as described in R309-215-15(19) within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(xiv) Ozone: Summary of CT values for each day as described in R309-215-15(19) within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(xv) UV:

(A) Validation test results demonstrating operating conditions that achieve required UV dose no later than the applicable treatment compliance date in R309-215-15(13).

(B) Monthly report summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within validated conditions for the required dose as specified in R309-215-15(19) (d) within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in R309-215-15(13).

(21) Recordkeeping requirements.

(a) Systems must keep results from the initial round of source water monitoring under R309-215-15(2)(a) and the second round of source water monitoring under R309-215-15(2)(b) until 3 years after bin classification under R309-215-15(11) for filtered systems for the particular round of monitoring.

(b) Systems must keep any notification to the Director that they will not conduct source water monitoring due to meeting the criteria of R309-215-15(2)(d) for 3 years.

(c) Systems must keep the results of treatment monitoring associated with microbial toolbox options under R309-215-15(15) through R309-215-15(19) for 3 years.

(22) Requirements for Sanitary Surveys Performed by EPA.

Requirements to respond to significant deficiencies identified in sanitary surveys performed by EPA.

(a) A sanitary survey is an onsite review of the water source (identifying sources of contamination by using results of source water assessments where available), facilities, equipment, operation, maintenance, and monitoring compliance of a PWS to evaluate the adequacy of the PWS, its sources and operations, and the distribution of safe drinking water.

(b) For the purposes of this section, a significant deficiency includes a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that EPA determines to be causing, or has the potential for causing the introduction of contamination into the water delivered to consumers.

(c) For sanitary surveys performed by EPA, systems must respond in writing to significant deficiencies identified in sanitary survey reports no later than 45 days after receipt of the report, indicating how and on what schedule the system will address significant deficiencies noted in the survey.

(d) Systems must correct significant deficiencies identified in sanitary survey reports according to the schedule approved by EPA, or if there is no approved schedule, according to the schedule reported under paragraph (c) of this section if such deficiencies are within the control of the system.

R309-215-16. Groundwater Rule.

(1) Applicability:

This subpart applies to all public water systems that use ground water except that it does not apply to public water systems that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment. For the purposes of this subpart, "ground water system" is defined as any public water system meeting this applicability, including consecutive systems receiving finished ground water.

(a) General requirements: Systems subject to this subpart must comply with the following requirements:

(i) Sanitary survey information requirements for all ground water systems as described in R309-100-7.

(ii) Microbial source water monitoring requirements for ground water systems that do not treat all of their ground water to at least 99.99 percent (4-log) treatment of viruses (using inactivation, removal, or an Director-approved combination of 4-log virus inactivation and removal) before or at the first customer as described in R309-215-16(2).

(iii) Treatment technique requirements, described in R309-215-16(3), that apply to ground water systems that have fecally contaminated source waters, as determined by source water monitoring conducted under R309-215-16(2), or that have significant deficiencies that are identified by the Director or that are identified by EPA under SDWA section 1445. A ground water system with fecally contaminated source water or with significant deficiencies subject to the treatment technique requirements of this subpart must implement one or more of the following corrective action options: correct all significant deficiencies; provide an alternate source of water; eliminate the source of contamination; or provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer.

(b) Ground water systems that provide at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer are required to conduct compliance monitoring to demonstrate treatment effectiveness, as described in R309-215-16(3)(b).

(c) If requested by the Director, ground water systems must provide the Director with any existing information that will enable the Director to perform a hydrogeologic sensitivity assessment. For the purposes of this subpart, "hydrogeologic sensitivity assessment" is a determination of whether ground water systems obtain water from hydrogeologically sensitive settings.

(d) Compliance date: Ground water systems must comply, unless otherwise noted, with the requirements of this subpart beginning December 1, 2009.

(2) Ground water source microbial monitoring and analytical methods.

(a) Triggered source water monitoring.

(i) General requirements. A ground water system must conduct triggered source water monitoring if the conditions identified in paragraphs (a)(i)(A) and (a)(i)(B) of this section exist.

(A) The system does not provide at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for each ground water source; and

(B) The system is notified that a sample collected under R309-210-5(1)is total coliform-positive and the sample is not invalidated under R309-210-5(4).

(ii) Sampling Requirements. A ground water system must collect, within 24 hours of notification of the total coliform-positive sample, at least one ground water source sample from each ground water source in use at the time the total coliform-positive sample was collected under R309-210-5(1), except as provided in paragraph (a)(ii)(B) of this section.

(A) The Director may extend the 24-hour time limit on a case-by-case basis if the system cannot collect the ground water source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, the Director must specify how much time the system has to collect the sample.

(B) If approved by the Director, systems with more than one ground water source may meet the requirements of this paragraph (a)(ii) by sampling a representative ground water source or sources. Systems must submit for Director approval a triggered source water monitoring plan that identifies one or more ground water sources that are representative of each monitoring site in the system's sample site plan under R309-210-5(1)(d) and that the system intends to use for representative sampling under this paragraph.

(C) A ground water system serving 1,000 people or fewer may use a repeat sample collected from a ground water source to meet both the requirements of R309-210-5(2)(a) and to satisfy the monitoring

requirements of paragraph (a)(ii) of this section for that ground water source only if the Director approves the use of E. coli as a fecal indicator for source water monitoring under this paragraph (a). If the repeat sample collected from the ground water source is E.coli positive, the system must comply with paragraph (a)(iii) of this section.

(iii) Additional Requirements. If the Director does not require corrective action under R309-215-16(3)(a)(ii) for a fecal indicator-positive source water sample collected under paragraph (a)(ii) of this section that is not invalidated under paragraph (d) of this section, the system must collect five additional source water samples from the same source within 24 hours of being notified of the fecal indicator-positive sample.

(iv) Consecutive and Wholesale Systems.

(A) In addition to the other requirements of this paragraph (a), a consecutive ground water system that has a total coliform-positive sample collected under R309-210-5(1) must notify the wholesale system(s) within 24 hours of being notified of the total coliform-positive sample.

(B) In addition to the other requirements of this paragraph (a), a wholesale ground water system must comply with paragraphs (a)(iv)(B)(I) and (a)(iv)(B)(II) of this section.

(I) A wholesale ground water system that receives notice from a consecutive system it serves that a sample collected under R309-210-5(1) is total coliform-positive must, within 24 hours of being notified, collect a sample from its ground water source(s) under paragraph (a)(ii) of this section and analyze it for a fecal indicator under paragraph (c) of this section.

(II) If the sample collected under paragraph (a)(iv)(B)(I) of this section is fecal indicator-positive, the wholesale ground water system must notify all consecutive systems served by that ground water source of the fecal indicator source water positive within 24 hours of being notified of the ground water source sample monitoring result and must meet the requirements of paragraph (a)(iii) of this section.

(v) Exceptions to the Triggered Source Water Monitoring Requirements. A ground water system is not required to comply with the source water monitoring requirements of paragraph (a) of this section if either of the following conditions exists:

(A) The Director determines, and documents in writing, that the total coliform-positive sample collected under R309-210-5(1)is caused by a distribution system deficiency; or

(B) The total coliform-positive sample collected under R309-210-5(1) is collected at a location that meets Director criteria for distribution system conditions that will cause total coliform-positive samples.

(b) Assessment Source Water Monitoring. If directed by the Director, ground water systems must conduct assessment source water monitoring that meets Director-determined requirements for such monitoring. A ground water system conducting assessment source water monitoring may use a triggered source water sample collected under paragraph (a)(ii) of this section to meet the requirements of paragraph (b) of this section. Director-determined assessment source water monitoring requirements may include:

(i) collection of a total of 12 ground water source samples that represent each month the system provides ground water to the public,

(ii) collection of samples from each well unless the system obtains written Director approval to conduct monitoring at one or more wells within the ground water system that are representative of multiple wells used by that system and that draw water from the same hydrogeologic setting,

(iii) collection of a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used,

(iv) analysis of all ground water source samples in accordance with R309-210-4(1) and R309-200-4(3) for the presence of E. coli, enterococci, or coliphage,

(v) collection of ground water source samples at a location prior to any treatment of the ground water source unless the Director approves a sampling location after treatment, and

(vi) collection of ground water source samples at the well itself unless the system's configuration does not allow for sampling at the well itself and the Director approves an alternate sampling location that is representative of the water quality of that well.

(c) Invalidation of a fecal indicator-positive ground water source sample.

(i) A ground water system may obtain Director invalidation of a fecal indicator-positive ground water source sample collected under paragraph (a)

of this section only under the conditions specified in paragraphs (c)(i)(A) and (B) of this section.

(A) The system provides the Director with written notice from the laboratory that improper sample analysis occurred; or

(B) The Director determines and documents in writing that there is substantial evidence that a fecal indicator-positive ground water source sample is not related to source water quality.

(ii) If the Director invalidates a fecal indicator-positive ground water source sample, the ground water system must collect another source water sample under paragraph (a) of this section within 24 hours of being notified by the Director of its invalidation decision and have it analyzed for the same fecal indicator using the analytical methods in paragraph (c) of this section. The Director may extend the 24-hour time limit on a case-by-case basis if the system cannot collect the source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, the Director must specify how much time the system has to collect the sample.

(d) Sampling location.

(i) Any ground water source sample required under paragraph (a) of this section must be collected at a location prior to any treatment of the ground water source unless the Director approves a sampling location after treatment.

(ii) If the system's configuration does not allow for sampling at the well itself, the system may collect a sample at a Director-approved location to meet the requirements of paragraph (a) of this section if the sample is representative of the water quality of that well.

(e) New Sources. If directed by the Director, a ground water system that places a new ground water source into service after November 30, 2009, must conduct assessment source water monitoring under paragraph (b) of this section. If directed by the Director, the system must begin monitoring before the ground water source is used to provide water to the public.

(f) Public Notification. A ground water system with a ground water source sample collected under paragraph (a) or (b) of this section that is fecal indicator-positive and that is not invalidated under paragraph (d) of this section, including consecutive systems served by the ground water source, must conduct public notification under R309-220-5.

(g) Monitoring Violations. Failure to meet the requirements of paragraphs (a)-(f) of this section is a monitoring violation and requires the ground water system to provide public notification under R309-220-7.

(3) Treatment technique requirements for ground water systems.

(a) Ground water systems with significant deficiencies or source water fecal contamination.

(i) The treatment technique requirements of this section must be met by ground water systems when a significant deficiency is identified or when a ground water source sample collected under R309-215-16(2)(a)(iii) is fecal indicator-positive.

(ii) If directed by the Director, a ground water system with a ground water source sample collected under R309-215-16(2)(a)(ii), R309-215-16(2)(a)(iv), or R309-215-16(2)(b) that is fecal indicator-positive must comply with the treatment technique requirements of this section.

(iii) When a significant deficiency is identified at a public water system that uses both ground water and surface water or ground water under the direct influence of surface water, the system must comply with provisions of this paragraph except in cases where the Director determines that the significant deficiency is in a portion of the distribution system that is served solely by surface water or ground water under the direct influence of surface water.

(iv) Unless the Director directs the ground water system to implement a specific corrective action, the ground water system must consult with the Director regarding the appropriate corrective action within 30 days of receiving written notice from the Director of a significant deficiency, written notice from a laboratory that a ground water source sample collected under R309-215-16(2)(a)(iii) was found to be fecal indicator-positive, or direction from the Director that a fecal indicator-positive collected under R309-215-16(2)(a)(ii), R309-215-16(2)(a)(iv), or R309-215-16(2)(b) requires corrective action. For the purposes of this subpart, significant deficiencies include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the Director determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

(v) Within 120 days (or earlier if directed by the Director) of receiving written notification from the Director of a significant deficiency, written notice from a laboratory that a ground water source sample collected under R309-215-16(2)(a)(iii) was found to be fecal indicator-positive, or direction

from the Director that a fecal indicator-positive sample collected under R309-215-16(2)(a)(ii), R309-215-16(2)(a)(iv), or R309-215-16(2)(b) requires corrective action, the ground water system must either:

(A) have completed corrective action in accordance with applicable Director plan review processes or other Director guidance or direction, if any, including Director-specified interim measures; or

(B) be in compliance with a Director-approved corrective action plan and schedule subject to the conditions specified in paragraphs (a)(v)(B)(I) and (a)(v)(B)(II) of this section.

(I) Any subsequent modifications to a Director-approved corrective action plan and schedule must also be approved by the Director.

(II) If the Director specifies interim measures for protection of the public health pending Director approval of the corrective action plan and schedule or pending completion of the corrective action plan, the system must comply with these interim measures as well as with any schedule specified by the Director.

(vi) Corrective Action Alternatives. Ground water systems that meet the conditions of paragraph (a)(i) or (a)(ii) of this section must implement one or more of the following corrective action alternatives:

(A) correct all significant deficiencies;

(B) provide an alternate source of water;

(C) eliminate the source of contamination; or

(D) provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

(vii) Special notice to the public of significant deficiencies or source water fecal contamination.

(A) In addition to the applicable public notification requirements of R309-220-5, a community ground water system that receives notice from the Director of a significant deficiency or notification of a fecal indicator-positive ground water source sample that is not invalidated by the Director under R309-215-16(2)(d) must inform the public

served by the water system under R309-225-5(8)of the fecal indicator-positive source sample or of any significant deficiency that has not been corrected. The system must continue to inform the public annually until the significant deficiency is corrected or the fecal contamination in the ground water source is determined by the Director to be corrected under paragraph (a)(v) of this section.

(B) In addition to the applicable public notification requirements of R309-220-5, a non-community ground water system that receives notice from the Director of a significant deficiency must inform the public served by the water system in a manner approved by the Director of any significant deficiency that has not been corrected within 12 months of being notified by the Director, or earlier if directed by the Director. The system must continue to inform the public annually until the significant deficiency is corrected. The information must include:

(I) The nature of the significant deficiency and the date the significant deficiency was identified by the Director;

(II) The Director-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed; and

(III) For systems with a large proportion of non-English speaking consumers, as determined by the Director, information in the appropriate language(s) regarding the importance of the notice or a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.

(C) If directed by the Director, a non-community water system with significant deficiencies that have been corrected must inform its customers of the significant deficiencies, how the deficiencies were corrected, and the dates of correction under paragraph (a)(vii)(B) of this section.

(b) Compliance monitoring.

(i) Existing ground water sources. A ground water system that is not required to meet the source water monitoring requirements of this subpart for any ground water source because it provides at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for any ground water source before December 1, 2009, must notify the Director in writing

that it provides at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for the specified ground water source and begin compliance monitoring in accordance with paragraph (b)(iii) of this section by December 1, 2009. Notification to the Director must include engineering, operational, or other information that the Director requests to evaluate the submission. If the system subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source, the system must conduct ground water source monitoring as required under R309-215-16(2).

(ii) New ground water sources. A ground water system that places a ground water in service after November 30, 2009, that is not required to meet the source water monitoring requirements of this subpart because the system provides at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source must comply with the requirements of paragraphs (b)(ii)(A), (b)(ii)(B) and (b)(ii)(C) of this section.

(A) The system must notify the Director in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source. Notification to the Director must include engineering, operational, or other information that the Director requests to evaluate the submission.

(B) The system must conduct compliance monitoring as required under R309-215-16(3)(b)(iii) of this subpart within 30 days of placing the source in service.

(C) The system must conduct ground water source monitoring under R309-215-16(2) if the system subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

(iii) Monitoring requirements. A ground water system subject to the requirements of paragraph (b)(i) or (b)(ii) of this section must monitor the effectiveness and reliability of treatment for that ground water source before or at the first customer as follows:

(A) Chemical disinfection.

(I) Ground water systems serving greater than 3,300 people. A ground water system that serves greater than 3,300 people must continuously monitor the residual disinfectant concentration using analytical methods specified in R444-14-4 at a location approved by the Director and must record the lowest residual disinfectant concentration each day that water from the ground water source is served to the public. The ground water system must maintain the Director-determined residual disinfectant concentration every day the ground water system serves water from the ground water source to the public. If there is a failure in the continuous monitoring equipment, the ground water system must conduct grab sampling every four hours until the continuous monitoring equipment is returned to service. The system must resume continuous residual disinfectant monitoring within 14 days.

(II) Ground water systems serving 3,300 or fewer people. A ground water system that serves 3,300 or fewer people must monitor the residual disinfectant concentration using analytical methods specified in R444-14-4 at a location approved by the Director and record the residual disinfection concentration each day that water from the ground water source is served to the public. The ground water system must maintain the Director-determined residual disinfectant concentration every day the ground water system serves water from the ground water source to the public. The ground water system must take a daily grab sample during the hour of peak flow or at another time specified by the Director. If any daily grab sample measurement falls below the Director-determined residual disinfectant concentration, the ground water system must take follow-up samples every four hours until the residual disinfectant concentration is restored to the Director-determined level. Alternatively, a ground water system that serves 3,300 or fewer people may monitor continuously and meet the requirements of paragraph (b)(iii)(A)(I) of this section.

(B) Membrane filtration. A ground water system that uses membrane filtration to meet the requirements of this subpart must monitor the membrane filtration process in accordance with all Director-specified monitoring requirements and must operate the membrane filtration in accordance with all Director-specified compliance requirements. A ground water system that uses membrane filtration is in compliance with the requirement to achieve at least 4-log removal of viruses when:

(I) The membrane has an absolute molecular weight cut-off (MWCO), or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses;

(II) The membrane process is operated in accordance with Director-specified compliance requirements; and

(III) The integrity of the membrane is intact.

(C) Alternative treatment. A ground water system that uses a Director-approved alternative treatment to meet the requirements of this subpart by providing at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer must:

(I) Monitor the alternative treatment in accordance with all Director-specified monitoring requirements; and

(II) Operate the alternative treatment in accordance with all compliance requirements that the Director determines to be necessary to achieve at least 4-log treatment of viruses.

(c) Discontinuing treatment. A ground water system may discontinue 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source if the Director determines and documents in writing that 4-log treatment of viruses is no longer necessary for that ground water source. A system that discontinues 4-log treatment of viruses is subject to the source water monitoring and analytical methods requirements of R309-215-16(2) of this subpart.

(d) Failure to meet the monitoring requirements of paragraph (b) of this section is a monitoring violation and requires the ground water system to provide public notification under R309-220-7.

(4) Treatment technique violations for ground water systems.

(a) A ground water system with a significant deficiency is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the Director) of receiving written notice from the Director of the significant deficiency, the system:

(i) Does not complete corrective action in accordance with any applicable Director plan review processes or other Director guidance and direction, including Director specified interim actions and measures, or

(ii) Is not in compliance with a Director-approved corrective action plan and schedule.

(b) Unless the Director invalidates a fecal indicator-positive ground water source sample under R309-215-16(2)(d), a ground water system is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the Director) of meeting the conditions of R309-215-16(3)(a)(i) or R309-215-16(3)(a)(ii), the system:

(i) Does not complete corrective action in accordance with any applicable Director plan review processes or other Director guidance and direction, including Director-specified interim measures, or

(ii) Is not in compliance with a Director-approved corrective action plan and schedule.

(c) A ground water system subject to the requirements of R309-215-16(3)(b)(iii) that fails to maintain at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source is in violation of the treatment technique requirement if the failure is not corrected within four hours of determining the system is not maintaining at least 4-log treatment of viruses before or at the first customer.

(d) Ground water system must give public notification under R309-220-6 for the treatment technique violations specified in paragraphs (a), (b) and (c) of this section.

(5) Reporting and recordkeeping for ground water systems.

(a) Reporting. In addition to the requirements of R309-105-16, a ground water system regulated under this subpart must provide the following information to the Director:

(i) A ground water system conducting compliance monitoring under R309-215-16(3)(b) must notify the Director any time the system fails to meet any Director-specified requirements including, but not limited to, minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, and alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within four hours. The ground water system must notify the Director as soon as possible, but in no case later than the end of the next business day.

(ii) After completing any corrective action under R309-215-16(3)(a), a ground water system must notify the Director within 30 days of completion of the corrective action.

(iii) If a ground water system subject to the requirements of R309-215-16(2)(a) does not conduct source water monitoring under R309-215-16(2)(a)(v)(B), the system must provide documentation to the Director within 30 days of the total coliform positive sample that it met the Director criteria.

(b) Recordkeeping. In addition to the requirements of R309-105-17, a ground water system regulated under this subpart must maintain the following information in its records:

(i) Documentation of corrective actions. Documentation shall be kept for a period of not less than ten years.

(ii) Documentation of notice to the public as required under R309-215-16(3)(a)(vii). Documentation shall be kept for a period of not less than three years.

(iii) Records of decisions under R309-215-16(2)(a)(v)(B) and records of invalidation of fecal indicator-positive ground water source samples under R309-215-16(2)(d). Documentation shall be kept for a period of not less than five years.

(iv) For consecutive systems, documentation of notification to the wholesale system(s) of total-coliform positive samples that are not invalidated under R309-210-5(4). Documentation shall be kept for a period of not less than five years.

(v) For systems, including wholesale systems, that are required to perform compliance monitoring under R309-215-16(3)(b):

(A) Records of the Director-specified minimum disinfectant residual. Documentation shall be kept for a period of not less than ten years.

(B) Records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the Director-prescribed minimum residual disinfectant concentration for a period of more than four hours. Documentation shall be kept for a period of not less than five years.

(C) Records of Director-specified compliance requirements for membrane filtration and of parameters specified by the Director for Director-approved alternative treatment and records of the date and

duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements for more than four hours. Documentation shall be kept for a period of not less than five years.

KEY: drinking water, surface water treatment plant monitoring, disinfection monitoring, compliance determinations
Date of Enactment or Last Substantive Amendment: September 21, 2010
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R309-220. Monitoring and Water Quality: Public Notification Requirements.

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R309-220. Monitoring and Water Quality: Public Notification Requirements.

R309-220-1. Purpose.

The purpose of this rule is to outline the public notification requirements for public water systems.

R309-220-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104 of the Utah Code and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-220-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-220-4. General Public Notification Requirements.

(1) Violation Categories and Other Situations Requiring a Public Notice:

Each owner or operator of a public water system (community water systems, non-transient non-community water systems, and transient non-community water systems) must give notice for all violations of these rules and for other situations, as listed below. The term "UPDWR violations" is used in this subpart to include violations of the maximum contaminant level (MCL), maximum residual disinfection level (MRDL), treatment technique (TT), monitoring requirements, and testing procedures contained in R309-100 through R309-215.

(a) UPDWR Violations:

(i) Failure to comply with an applicable maximum contaminant level (MCL) or maximum residual disinfectant level (MRDL).

(ii) Failure to comply with a prescribed treatment technique (TT).

(iii) Failure to perform water quality monitoring, as required by the drinking water regulations.

(iv) Failure to comply with testing procedures as prescribed by a drinking water regulation.

(b) Variance and Exemptions Under R309-10 and R309-11.

(i) Operation under a variance or an exemption.

(ii) Failure to comply with the requirements of any schedule that has been set under a variance or exemption.

(c) Special Public Notices

(i) Occurrence of a waterborne disease outbreak or other waterborne emergency.

(ii) Exceedance of the nitrate MCL by non-community water systems (NCWS), where granted permission by the Director under R309-200-5(1)(c), Table 200-1, note (4)(b).

(iii) Exceedance of the secondary maximum contaminant level (SMCL) for fluoride.

(iv) Availability of unregulated contaminant monitoring data.

(v) Other violations and situations determined by the Director to require a public notice under this subpart.

(2) Definition of Public Notice Tiers:

Public notice requirements are divided into three tiers, to take into account the seriousness of the violation or situation and of any potential adverse health effects that may be involved. The public notice requirements for each violation or situation listed in paragraph (1) of this section are determined by the tier to which it is assigned. Each tier is defined below:

(a) Tier 1 public notice -- required for UPDWR violations and situations with significant potential to have serious adverse effects on human health as a result of short-term exposure.

(b) Tier 2 public notice -- required for all other UPDWR violations and situations with potential to have serious adverse effects on human health.

(c) Tier 3 public notice -- required for all other UPDWR violations and situations not included in Tier 1 and Tier 2.

(3) Required Distribution of Notice

(a) Each public water system must provide public notice to persons served by the water system, in accordance with this rule. Public water systems that sell or otherwise provide drinking water to other public water systems (i.e., to consecutive systems) are required to give public notice to the owner or operator of the consecutive system; the consecutive system is responsible for providing public notice to the persons it serves.

(b) If a public water system has a violation in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system, the Director may allow the system to limit distribution of the public notice to only persons served by that portion of the system which is out of compliance. Permission by the Director for limiting distribution of the notice must be granted in writing.

(c) A copy of the notice must also be sent to the Director, in accordance with the requirements under R309-105-16.

R309-220-5. Tier 1 Public Notice -- Form, Manner and Frequency of Notice.

(1) Violation Categories and Other Situations Requiring a Tier 1 Public Notice:

(a) Violation of the MCL for total coliforms when fecal coliform or E. coli are present in the water distribution system (as specified in R309-200-5(6)(b)), or when the water system fails to test for fecal coliforms or E. coli when any repeat sample tests positive for coliform (as specified in R309-205-5(5));

(b) Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite, as defined in R309-200-5(1)(c), Table 200-1, or when the water system fails to take a confirmation sample within 24 hours of the system's receipt of the first sample showing an exceedance of the nitrate or nitrite MCL, as specified in R309-205-5(1)(e)(ii);

(c) Exceedance of the nitrate MCL by non-community water systems, where permitted to exceed the MCL by the Director under R309-200-5(1)(c), Table 200-1, note (4)(b), as required under R309-220-12;

(d) Violation of the MRDL for chlorine dioxide, as defined in 40 CFR section 141.65(a), when one or more samples taken in the distribution system the day following an exceedance of the MRDL at the entrance of the distribution system exceed the MRDL, or when the water system does not take the required samples in the distribution system, as specified in 40 CFR section 141.133(c)(2)(i);

(e) Violation of the turbidity MCL under R309-200-5(5)(a), where the Director determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;

(f) Violation of the Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment rule (IESWTR) or the Long Term 1 Enhanced Surface Water Treatment rule (LT1ESWTR) treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit, where the Director determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;

(g) Occurrence of a waterborne disease outbreak, as defined in R309-110, or other waterborne emergency (such as a failure or significant interruption in key water treatment processes, a natural disaster that disrupts the water supply or distribution system, or a chemical spill or unexpected loading of possible pathogens into the source water that significantly increases the potential for drinking water contamination);

(h) Other violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the Director either in its rules or on a case-by-case basis.

(i) Detection of E. coli, enterococci, or coliphage in source water samples as specified in R309-215-16(2)(a) and R309-215-16(2)(b).

(2) Frequency of the Tier 1 Public Notice and Additional Steps Required:

Public water systems must:

(a) Provide a public notice as soon as practical but no later than 24 hours after the system learns of the violation;

(b) Initiate consultation with the Director as soon as practical, but no later than 24 hours after the public water system learns of the violation or situation, to determine additional public notice requirements; and

(c) Comply with any additional public notification requirements (including any repeat notices or direction on the duration of the posted notices) that are established

as a result of the consultation with the Director. Such requirements may include the timing, form, manner, frequency, and content of repeat notices (if any) and other actions designed to reach all persons served.

(3) Form and Manner of the Public Notice:

Public water systems must provide the notice within 24 hours in a form and manner reasonably calculated to reach all persons served. The form and manner used by the public water system are to fit the specific situation, but must be designed to reach residential, transient, and non-transient users of the water system. In order to reach all persons served, water systems are to use, at a minimum, one or more of the following forms of delivery:

(a) Appropriate broadcast media (such as radio and television);

(b) Posting of the notice in conspicuous locations throughout the area served by the water system;

(c) Hand delivery of the notice to persons served by the water system; or

(d) Another delivery method approved in writing by the Director.

R309-220-6. Tier 2 Public Notice -- Form, Manner and Frequency of Notice.

(1) Violation Categories And Other Situations Requiring a Tier 2 Public Notice:

(a) All violations of the MCL, MRDL, and treatment technique requirements, except where a Tier 1 notice is required under R309-220-5(1) or where the Director determines that a Tier 1 notice is required;

(b) Violations of the monitoring and testing procedure requirements, where the Director determines that a Tier 2 rather than a Tier 3 public notice is required, taking into account potential health impacts and persistence of the violation; and

(c) Failure to comply with the terms and conditions of any variance or exemption in place.

(d) Failure to take corrective action or failure to maintain at least 4-log treatement of viruses (using inactivation, removal, or an Director-approved combination of 4-log virus inactiviation and removal) before or at the first customer under R309-215-16(3)(a).

(2) Frequency of the Tier 2 Public Notice:

(a) Public water systems must provide the public notice as soon as practical, but no later than 30 days after the system learns of the violation. If the public notice is posted, the notice must remain in place for as long as the violation or situation persists, but in no case for less than seven days, even if the violation or situation is resolved. The Director may, in appropriate circumstances, allow additional time for the initial notice of up to three months from the date the system learns of the violation. It is not appropriate for the Director to grant an extension to the 30-day deadline for any unresolved violation or to allow across-the-board extensions by rule or policy for other violations or situations requiring a Tier 2 public notice. Extensions granted by the Director must be in writing.

(b) The public water system must repeat the notice every three months as long as the violation or situation persists, unless the Director determines that appropriate circumstances warrant a different repeat notice frequency. In no circumstance may the repeat notice be given less frequently than once per year. It is not appropriate for the Director to allow less frequent repeat notice for an MCL violation under the Total Coliform Rule or a treatment technique violation under the Surface Water Treatment Rule, Interim Enhanced Surface Water Treatment Rule or Filter Backwash Recycling Rule. It is also not appropriate for the Director to allow through its rules or policies across-the-board reductions in the repeat notice frequency for other ongoing violations requiring a Tier 2 repeat notice. Director determinations allowing repeat notices to be given less frequently than once every three months must be in writing.

(c) For the turbidity violations specified in this paragraph, public water systems must consult with the Director as soon as practical but no later than 24 hours after the public water system learns of the violation, to determine whether a Tier 1 public notice under R309-220-5(1) is required to protect public health. When consultation does not take place within the 24-hour period, the water system must distribute a Tier 1 notice of the violation within the next 24 hours (i.e., no later than 48 hours after the system learns of the violation), following the requirements under R309-220-5(2) and (3). Consultation with the Director is required for:

(i) Violation of the turbidity MCL under R309-200-5(5)(a); or

(ii) Violation of the SWTR, IESWTR or LT1ESWTR treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit.

(3) Form and Manner of the Public Notice:

Public water systems must provide the initial public notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period.

The form and manner of the public notice may vary based on the specific situation and type of water system, but it must at a minimum meet the following requirements:

(a) Unless directed otherwise by the Director in writing, community water systems must provide notice by:

(i) Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

(ii) Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in paragraph (3)(a)(i) of this section. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include: publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places served by the system or on the Internet; or delivery to community organizations.

(b) Unless directed otherwise by the Director in writing, non-community water systems must provide notice by:

(i) Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and

(ii) Any other method reasonably calculated to reach other persons served by the system if they would not normally be reached by the notice required in paragraph (3)(b)(i) of this section. Such persons may include those served who may not see a posted notice because the posted notice is not in a location they routinely pass by. Other methods may include: publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or, delivery of multiple copies in central locations (e.g., community centers).

R309-220-7. Tier 3 Public Notice -- Form, Manner and Frequency of Notice.

(1) Violation Categories And Other Situations Requiring a Tier 3 Public Notice:

(a) Monitoring violations under R309-205, R309-210 and R309-215, except where a Tier 1 notice is required under R309-220-5(1) or where the Director determines that a Tier 2 notice is required;

(b) Failure to comply with a testing procedure established in R309-205, R309-210 and R309-215, except where a Tier 1 notice is required under R309-220-5(1) or where the Director determines that a Tier 2 notice is required;

(c) Operation under a variance granted under R309-100-10;

(d) Availability of unregulated contaminant monitoring results, as required under R309-220-10; and

(e) Exceedance of the fluoride secondary maximum contaminant level (SMCL), as required under R309-220-11.

(2) Frequency of the Tier 3 Public Notice:

(a) Public water systems must provide the public notice not later than one year after the public water system learns of the violation or situation or begins operating under a variance or exemption. Following the initial notice, the public water system must repeat the notice annually for as long as the violation, variance, exemption, or other situation persists. If the public notice is posted, the notice must remain in place for as long as the violation, variance, exemption, or other situation persists, but in no case less than seven days (even if the violation or situation is resolved).

(b) Instead of individual Tier 3 public notices, a public water system may use an annual report detailing all violations and situations that occurred during the previous twelve months, as long as the timing requirements of paragraph (2)(a) of this section are met.

(3) Form and Manner of the Public Notice:

Public water systems must provide the initial notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it must at a minimum meet the following requirements:

(a) Unless directed otherwise by the Director in writing, community water systems must provide notice by:

(i) Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

(ii) Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in paragraph (3)(a)(i) of this section. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include: publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places or on the Internet; or delivery to community organizations.

(b) Unless directed otherwise by the Director in writing, non-community water systems must provide notice by:

(i) Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and

(ii) Any other method reasonably calculated to reach other persons served by the system, if they would not normally be reached by the notice required in paragraph (3)(b)(i) of this section. Such persons may include those who may not see a posted notice because the notice is not in a location they routinely pass by. Other methods may include: publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or, delivery of multiple copies in central locations (e.g., community centers).

(4) Use of the Consumer Confidence Report to meet the Tier 3 public notice requirements:

For community water systems, the Consumer Confidence Report (CCR) required under R309-225 may be used as a vehicle for the initial Tier 3 public notice and all required repeat notices, as long as:

(a) The CCR is provided to persons served no later than 12 months after the system learns of the violation or situation as required under R309-220-7(2);

(b) The Tier 3 notice contained in the CCR follows the content requirements under R309-220-8; and

(c) The CCR is distributed following the delivery requirements under R309-220-7(3).

R309-220-8. Content of the Public Notice.

(1) When a public water system violates a UPDWR or has a situation requiring public notification, each public notice must include the following elements:

(a) A description of the violation or situation, including the contaminant(s) of concern, and (as applicable) the contaminant level(s);

(b) When the violation or situation occurred;

(c) Any potential adverse health effects from the violation or situation, including the standard language under paragraph (4)(a) or (4)(b) of this section, whichever is applicable;

(d) The population at risk, including subpopulations particularly vulnerable if exposed to the contaminant in their drinking water;

(e) Whether alternative water supplies should be used;

(f) What actions consumers should take, including when they should seek medical help, if known;

(g) What the system is doing to correct the violation or situation;

(h) When the water system expects to return to compliance or resolve the situation;

(i) The name, business address, and phone number of the water system owner, operator, or designee of the public water system as a source of additional information concerning the notice; and

(j) A statement to encourage the notice recipient to distribute the public notice to other persons served, using the standard language under paragraph (4)(c) of this section, where applicable.

(2) Required elements to be included in the public notice for public water systems operating under a variance or exemption:

(a) If a public water system has been granted a variance or an exemption, the public notice must contain:

(i) An explanation of the reasons for the variance or exemption;

(ii) The date on which the variance or exemption was issued;

(iii) A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption; and

(iv) A notice of any opportunity for public input in the review of the variance or exemption.

(b) If a public water system violates the conditions of a variance or exemption, the public notice must contain the ten elements listed in paragraph (1) of this section.

(3) Presentation of the public notice.

(a) Each public notice required by this section:

(i) Must be displayed in a conspicuous way when printed or posted;

(ii) Must not contain overly technical language or very small print;

(iii) Must not be formatted in a way that defeats the purpose of the notice;

(iv) Must not contain language which nullifies the purpose of the notice.

(b) Each public notice required by this section must comply with multilingual requirements, as follows:

(i) For public water systems serving a large proportion of non-English speaking consumers, as determined by the Director, the public notice must contain information in the appropriate language(s) regarding the importance of the notice or contain a telephone number or address where persons served may contact the water system to obtain a translated copy of the notice or to request assistance in the appropriate language.

(ii) In cases where the Director has not determined what constitutes a large proportion of non-English speaking consumers, the public water system must include in the public notice the same information as in paragraph (3)(b)(i) of this section, where appropriate to reach a large proportion of non-English speaking persons served by the water system.

(4) Public water systems are required to include the following standard language in their public notice:

(a) Standard health effects language for MCL or MRDL violations, treatment technique violations, and violations of the condition of a variance or exemption. Public water systems must include in each public notice the health effects language specified in R309-220-14 corresponding to each MCL, MRDL, and treatment technique violation and for each violation of a condition of a variance or exemption.

(b) Standard language for monitoring and testing procedure violations.

Public water systems must include the following language in their notice, including the language necessary to fill in the blanks, for all monitoring and testing procedure violations: "We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During (compliance period), we ('did not monitor or test' or 'did not complete all monitoring or testing') for (contaminant(s)), and therefore cannot be sure of the quality of your drinking water during that time."

(c) Standard language to encourage the distribution of the public notice to all persons served. Public water systems must include in their notice the following language (where applicable): "Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail."

R309-220-9. Notice to New Billing Units or New Customers.

(1) Community water systems must give a copy of the most recent public notice for any continuing violation, the existence of a variance or exemption, or other ongoing situations requiring a public notice to all new billing units or new customers prior to or at the time service begins.

(2) Non-community water systems must continuously post the public notice in conspicuous locations in order to inform new consumers of any continuing violation, variance or exemption, or other situation requiring a public notice for as long as the violation, variance, exemption, or other situation persists.

R309-220-10. Special Notice of the Availability of Unregulated Contaminant Monitoring Results.

(1) Applicability of the special notice: The owner or operator of a community water system or non-transient, non-community water system required to monitor under 40 CFR section 141.40 must notify persons served by the system of the availability of the results of such sampling no later than 12 months after the monitoring results are known.

(2) Required form and manner of the special notice: The form and manner of the public notice must follow the requirements for a Tier 3 public notice prescribed in R309-220-7(3), (4)(a), and (4)(c). The notice must also identify a person and provide the telephone number to contact for information on the monitoring results.

R309-220-11. Special Notice for Exceedance of the Secondary MCL for Fluoride.

(1) Applicability of the special notice: Community water systems that exceed the fluoride secondary maximum contaminant level (SMCL) of 2 mg/l as specified in R309-200-6 (determined by the last single sample taken in accordance with R309-205-5), but do not exceed the maximum contaminant level (MCL) of 4 mg/l for fluoride (as specified in R309-200-5), must provide the public notice in paragraph (3) of this section to persons served. Public notice must be provided as soon as practical but no later than 12 months from the day the water system learns of the exceedance. A copy of the notice must also be sent to all new billing units and new customers at the time service begins and to the State public health officer. The public water system must repeat the notice at least annually for as long as the SMCL is exceeded. If the public notice is posted, the notice must remain in place for as long as the SMCL is exceeded, but in no case less than seven days (even if the exceedance is eliminated). On a case-by-case basis, the Director may require an initial notice sooner than 12 months and repeat notices more frequently than annually.

(2) Required form and manner of the special notice: The form and manner of the public notice (including repeat notices) must follow the requirements for a Tier 3 public notice in R309-220-7(3), (4)(a), and (4)(c).

(3) Required mandatory language to be contained in the special notice: The notice must contain the following language, including the language necessary to fill in the blanks:

This is an alert about your drinking water and a cosmetic dental problem that might affect children under nine years of age. At low levels, fluoride can help prevent cavities, but children drinking water containing more than 2 milligrams per liter (mg/l) of fluoride may develop cosmetic discoloration of their permanent teeth (dental fluorosis). The drinking water provided by your community water system (name) has a fluoride concentration of (insert value) mg/l.

Dental fluorosis, in its moderate or severe forms, may result in a brown staining and/or pitting of the permanent teeth. This problem occurs only in developing teeth, before they erupt from the gums. Children under nine should be provided with alternative sources of drinking water or water that has been treated to remove the fluoride to avoid the possibility of staining and pitting of their permanent teeth. You may also want to contact your dentist about proper use by young children of fluoride-containing products. Older children and adults may safely drink the water.

Drinking water containing more than 4 mg/l of fluoride (the U.S. Environmental Protection Agency's drinking water standard) can increase your risk of developing bone disease. Your drinking water does not contain more than 4 mg/l of fluoride, but we're required to notify you when we discover that the fluoride levels in your drinking water exceed 2 mg/l because of this cosmetic dental problem.

For more information, please call (name of water system contact) of (name of community water system) at (phone number). Some home water treatment units are also available to remove fluoride from drinking water. To learn more about available home water treatment units, you may call NSF International at 1-877-8-NSF-HELP.

R309-220-12. Special Notice for Nitrate Exceedances above MCL by Non-Community Water Systems (NCWS), where Granted Permission by the Director.

(1) Applicability of the special notice: The owner or operator of a non-community water system granted permission by the Director under R309-200-5(1)(c), Table 200-1, note (4)(b) to exceed the nitrate MCL must provide notice to persons served according to the requirements for a Tier 1 notice under R309-220-5 (1) and (2).

(2) Required form and manner of the special notice: Non-community water systems granted permission by the Director to exceed the nitrate MCL under R309-200-5(1)(c), Table 200-1, note (4)(b) must provide continuous posting of the fact that nitrate levels exceed 10 mg/l and the potential health effects of exposure, according to the requirements for Tier 1 notice delivery under R309-220-5(3) and the content requirements under R309-220-8.

R309-220-13. Special Notice for Repeated Failure to Conduct Monitoring of the Source Water for Cryptosporidium and for Failure to Determine Bin Classification or Mean Cryptospridium Level.

(1) Applicability of the special notice for repeated failure to monitor: The owner or operator of a community or non-community water system that is required to monitor source water under R309-215-15(2) must notify persons served by the water system that monitoring has not been completed as specified no later than 30 days after the system has failed to collect any 3 months of monitoring as specified in R309-215-15(2)(c). The notice must be repeated as specified in R309-220-6(2).

(2) Applicability of the special notice for failure to determine bin classification: The owner or operator of a community or non-community water system that is required to determine a bin classification under R309-215-15(11) must notify persons served by the water system that the determination has not been made as required no later than 30 days after the system has failed report the determination as specified in R309-215-15(11)(e). The notice must be repeated as specified in R309-220-6(2). The notice is not required if the system is complying with a Director-approved schedule to address the violation.

(3) Required form and manner of the special notice: The form and manner of the public notice must follow the requirements for a Tier 2 public notice prescribed in R309-220-6(3). The public notice must be presented as required in R309-220-8(3).

(4) Required mandatory language to be contained in the special notice: The notice must contain the following language, including the language necessary to fill in the blanks.

(a) The special notice for repeated failure to conduct monitoring must contain the following language: We are required to monitor the source of your drinking water for Cryptosporidium. Results of the monitoring are to be used to determine whether water treatment at the (treatment plant name) is sufficient to adequately remove Cryptosporidium from your drinking water. We are required to complete this monitoring and make this determination by (required bin determination date). We "did not monitor or test" or "did not complete all monitoring or testing on schedule" and, therefore, we may not be able to determine by the required date what treatment modifications, if any, must be made to ensure adequate Cryptosporidium removal. Missing this deadline may, in turn, jeopardize our ability to have the required treatment modifications, if any, completed by the deadline required, (date). For more information, please call (name of water system contact) of (name of water system) at (phone number).

(b) The special notice for failure to determine bin classification or mean Cryptosporidium level must contain the following language: We are required to monitor the source of your drinking water for Cryptosporidium in order to determine by (date) whether water treatment at the (treatment plant name) is sufficient to adequately remove Cryptosporidium from your drinking water. We have not made this determination by the required date. Our failure to do this may jeopardize our ability to have the required treatment modifications, if any, completed by the required deadline of (date). For more information, please call (name of water system contact) of (name of water system) at (phone number).

(c) Each special notice must also include a description of what the system is doing to correct the violation and when the system expects to return to compliance or resolve the situation.

R309-220-14. Notice by Director on behalf of the Public Water System.

(1) The Director may give the notice required by this rule on behalf of the owner and operator of the public water system if the Director complies with the requirements of this rule.

(2) The owner or operator of the public water system remains responsible for ensuring that the requirements of this rule are met.

R309-220-15. Standard Health Effects Language.

Microbiological Contaminants:

(1) Total Coliform. Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.

(2) Fecal coliform/E.Coli. Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

(3) Total organic carbon. Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acides (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer.

(4) Turbidity. Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches. Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR), Long Term 1 Enhanced Surface Water Treatment Rule (LT1) and Filter Backwash Recycling Rule (FBRR) violations.

(5) Giardia lamblia. Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

(6) Viruses. Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

(7) Heterotrophic plate count (HPC) bacteria. Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

(8) Legionella. Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

(9) Cryptosporidium. Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

(10) Fecal Indicators. Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these waste can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

Radioactive Contaminants:

(11) Alpha emitters. Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.

(12) Beta/photon emitters. Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.

(13) Combined Radium 226/228. Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.

(14) Uranium. Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.

Inorganic Contaminants:

(15) Antimony. Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.

(16) Arsenic. Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.

(17) Asbestos. Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.

(18) Barium. Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.

(19) Beryllium. Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions.

(20) Cadmium. Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.

(21) Chromium. Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.

(22) Copper. Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.

(23) Cyanide. Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.

(24) Fluoride. Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Fluoride in drinking water at half the MCL or more may cause mottling of children's teeth, usually in children less than nine years old. Mottling, also known as dental fluorisis, may include brown staining and/or pitting of the teeth, and occurs only in developing teeth before they erupt from the gums.

(25) Lead. Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.

(26) Mercury (inorganic). Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.

(27) Nitrate. Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.

(28) Nitrite. Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.

(29) Selenium. Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.

(30) Thallium. Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver.

Synthetic organic contaminants including pesticides and herbicides:

(31) 2,4-D. Some people who drink water containing the weed killer 2,4-D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands.

(32) 2,4,5-TP (Silvex). Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.

(33) Acrylamide. Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.

(34) Alachlor. Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.

(35) Atrazine. Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.

(36) Benzo(a)pyrene (PAH). Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.

(37) Carbofuran. Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.

(38) Chlordane. Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.

(39) Dalapon. Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.

(40) Di (2-ethylhexyl) adipate. Some people who drink water containing di (2-ethylhexyl) adipate well in excess of the MCL over many years could experience general toxic effects or reproductive difficulties.

(41) Di (2-ethylhexyl) phthalate. Some people who drink water containing di (2-ethylhexyl) phthalate in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer.

(42) Dibromochloropropane (DBCP). Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.

(43) Dinoseb. Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.

(44) Dioxin (2,3,7,8-TCDD). Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.

(45) Diquat. Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.

(46) Endothall. Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.

(47) Endrin. Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.

(48) Epichlorohydrin. Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.

(49) Ethylene dibromide. Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.

(50) Glyphosate. Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.

(51) Heptachlor. Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.

(52) Heptachlor epoxide. Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.

(53) Hexachlorobenzene. Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.

(54) Hexachlorocyclopentadiene. Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.

(55) Lindane. Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.

(56) Methoxychlor. Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.

(57) Oxamyl (Vydate). Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.

(58) PCBs (Polychlorinated biphenyls). Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer.

(59) Pentachlorophenol. Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer.

(60) Picloram. Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.

(61) Simazine. Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.

(62) Toxaphene. Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.

Volatile Organic Contaminants:

(63) Benzene. Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.

(64) Bromate. Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.

(65) Carbon Tetrachloride. Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.

(66) Chloramines. Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink

water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.

(67) Chlorine. Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.

(68) Chlorite. Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia.

(69) Chlorine dioxide. Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.

(70) Chlorobenzene. Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.

(71) o-Dichlorobenzene. Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.

(72) p-Dichlorobenzene. Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.

(73) 1,2-Dichloroethane. Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.

(74) 1,1-Dichloroethylene. Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.

(75) cis-1,2-Dichloroethylene. Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.

(76) trans-1,2-Dicholoroethylene. Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.

(77) Dichloromethane. Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.

(78) 1,2-Dichloropropane. Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.

(79) Ethylbenzene. Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.

(80) Haloacetic Acids (HAA). Some piple who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.

(81) Styrene. Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.

(82) Tetrachloroethylene. Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.

(83) 1,2,4-Trichlorobenzene. Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.

(84) 1,1,1,-Trichloroethane. Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.

(85) 1,1,2-Trichloroethane. Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.

(86) Trichloroethylene. Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.

(87) TTHMs (Total Trihalomethanes). Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.

(88) Toluene. Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.

(89) Vinyl Chloride. Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.

(90) Xylenes. Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.

KEY: drinking water, public notification, health effects

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R309-225. Monitoring and Water Quality: Consumer Confidence Reports.

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R309-225. Monitoring and Water Quality: Consumer Confidence Reports.

R309-225-1. Purpose.

This rule establishes the minimum requirements for the content of annual reports that community water systems must deliver to their customers. These reports must contain information on the quality of the water delivered by the systems and characterize the risks (if any) from exposure to contaminants detected in the drinking water in an accurate and understandable manner.

R309-225-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104 of the Utah Code and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-225-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

(1) For the purpose of R309-225, customers are defined as billing units or service connections to which water is delivered by a community water system.

(2) For the purpose of R309-225, detected means: at or above the levels prescribed by R444-14-4(2).

R309-225-4. General Requirements.

(1) This rule applies only to community water systems.

(2) Effective dates.

(a) Each existing community water system must deliver its first report by October 19, 1999, its second report by July 1, 2000, and subsequent reports by July 1 annually thereafter. The first report must contain data collected during, or prior to, calendar year 1998 as prescribed in R309-225-5(4)(c). Each report thereafter must contain data collected during, or prior to, the previous calendar year.

(b) A new community water system must deliver its first report by July 1 of the year after its first full calendar year in operation and annually thereafter.

(c) A community water system that sells water to another community water system must deliver the applicable information required in R309-225-5 to the buyer system:

(i) no later than April 19, 1999, by April 1, 2000, and by April 1 annually thereafter or

(ii) on a date mutually agreed upon by the seller and the purchaser, and specifically included in a contract between the parties.

R309-225-5. Content of the Reports.

(1) Each community water system must provide to its customers an annual report that contains the information specified in this section and R309-225-6.

(2) Information on the source of the water delivered.

(a) Each report must identify the source(s) of the water delivered by the community water system by providing information on:

(i) The type of the water: e.g., surface water, ground water; and

(ii) The commonly used name (if any) and location of the body (or bodies) of water.

(b) If a source water assessment has been completed, the report must notify consumers of the availability of this information and the means to obtain it. In addition, systems are encouraged to highlight in the report significant sources of contamination in the source water area if they have readily available information. Where a system has received a source water assessment from the Director, the report must include a brief summary of the system's susceptibility to potential sources of contamination, using language provided by the Director or written by the operator.

(3) Definitions.

(a) Each report must include the following definitions:

(i) Maximum Contaminant Level Goal or MCLG: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

(ii) Maximum Contaminant Level or MCL: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

(b) A report for a community water system operating under a variance or an exemption issued under R309-100-10 or R309-100-11 must include the following definition: Variances and Exemptions: Director or EPA permission not to meet an MCL or a treatment technique under certain conditions.

(c) A report which contains data on a contaminant that EPA regulates using any of the following terms must include the applicable definitions:

(i) Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.

(ii) Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

(iii) Maximum residual disinfectant level goal or MRDLG: The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

(iv) Maximum residual disinfectant level or MRDL: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

(4) Information on Detected Contaminants.

(a) This sub-section specifies the requirements for information to be included in each report for contaminants subject to mandatory monitoring (except Cryptosporidium). It applies to:

(i) Contaminants subject to an MCL, action level, maximum residual disinfectant level, or treatment technique (regulated contaminants);

(ii) Contaminants for which monitoring is required by 40 CFR section 141.40 (unregulated contaminants); and

(iii) Disinfection by-products or microbial contaminants for which monitoring is required by R309-210, R309-215 and 40 CFR sections

141.142 and 141.143, except as provided under paragraph (e)(1) of this section, and which are detected in the finished water.

(b) The data relating to these contaminants must be displayed in one table or in several adjacent tables. Any additional monitoring results which a community water system chooses to include in its report must be displayed separately.

(c) The data must be derived from data collected to comply with EPA and State monitoring and analytical requirements during calendar year 1998 for the first report and subsequent calendar years thereafter except that:

(i) Where a system is allowed to monitor for regulated contaminants less often than once a year, the table(s) must include the date and results of the most recent sampling and the report must include a brief statement indicating that the data presented in the report are from the most recent testing done in accordance with the regulations. No data older than 5 years need be included.

(ii) Results of monitoring in compliance with federal Information Collection Rule, (40 CFR sections 141.142 and 141.143) need only be included for 5 years from the date of last sample or until any of the detected contaminants becomes regulated and subject to routine monitoring requirements, whichever comes first.

(d) For detected regulated contaminants, the table(s) must contain:

(i) The MCL for that contaminant expressed as a number equal to or greater than 1.0;

(ii) The MCLG for that contaminant expressed in the same units as the MCL;

(iii) If there is no MCL for a detected contaminant, the table must indicate that there is a treatment technique, or specify the action level, applicable to that contaminant, and the report must include the definitions for treatment technique and/or action level, as appropriate, specified in paragraph(3)(c) of this section;

(iv) For contaminants subject to an MCL, except turbidity and total coliforms, the highest contaminant level used to determine compliance with the quality standards listed in R309-200 and the range of detected levels, as follows:

(A) When compliance with the MCL is determined annually or less frequently: the highest detected level at any sampling point and the range of detected levels expressed in the same units as the MCL.

(B) When compliance with the MCL is determined by calculating a running annual average of all samples taken at a sampling point: the highest average of any of the sampling points and the range of all sampling points expressed in the same units as the MCL. For the MCLs for TTHM and HAA5 in R309-200-5(3)(c)(vi), systems must include the highest locational running annual average for TTHM and HAA5 and the range of individual sample results for all monitoring locations expressed in the same units as the MCL. If more than one location exceeds the TTHM and HAA5 MCL, the system must include the locational running annual averages for all locations that exceed the MCL.

(C) When compliance with the MCL is determined on a system-wide basis by calculating a running annual average of all samples at all monitoring locations: the average and range of detection expressed in the same units as the MCL. The system is required to include individual sample results for the IDSE conducted under R309-210-9 when determining the range of TTHM and HAA5 results to be reported in the annual consumer confidence report for the calendar year that the IDSE samples were taken.

(D) When rounding of results to determine compliance with the MCL is allowed by the rules, rounding should be done prior to converting the number in order to express it as a number equal to or greater than 1.0.

(v) For turbidity.

(A) When it is reported pursuant to R309-205-8 and R309-215-9: the highest average monthly value.

(B) When it is reported pursuant to R309-215-9: the highest single measurement and the lowest monthly percentage of samples meeting the turbidity limits specified in R309-200-5(5)(a) and (b) for the filtration technology being used. The report should include an explanation of the reasons for measuring turbidity.

(vi) For lead and copper: the 90th percentile value of the most recent round of sampling and the number of sampling sites exceeding the action level.

(vii) For total coliform:

(A) The highest monthly number of positive samples for systems collecting fewer than 40 samples per month; or

(B) The highest monthly percentage of positive samples for systems collecting at least 40 samples per month.

(viii) For fecal coliform: the total number of positive samples.

(ix) The likely source(s) of detected contaminants to the best of the operator's knowledge. Specific information regarding contaminants may be available in sanitary surveys and source water assessments, and should be used when available to the operator. If the operator lacks specific information on the likely source, the report must include one or more of the typical sources for that contaminant listed in R309-225-8 that is most applicable to the system.

(e) If a community water system distributes water to its customers from multiple hydraulically independent distribution systems that are fed by different raw water sources, the table should contain a separate column for each service area and the report should identify each separate distribution system. Alternatively, systems could produce separate reports tailored to include data for each service area.

(f) The table(s) must clearly identify any data indicating violations of MCLs, MRDLs or treatment techniques and the report must contain a clear and readily understandable explanation of the violation including: the length of the violation, the potential adverse health effects, and actions taken by the system to address the violation. To describe the potential health effects, the system must use the relevant language in R309-220-14.

(g) For detected unregulated contaminants for which monitoring is required (except Cryptosporidium), the table(s) must contain the average and range at which the contaminant was detected. The report may include a brief explanation of the reasons for monitoring for unregulated contaminants.

(5) Information on Cryptosporidium, radon, and other contaminants.

(a) If the system has performed any monitoring for Cryptosporidium, including monitoring performed to satisfy the requirements of the federal Information Collection Rule (40 CFR section 141.143), which indicates that Cryptosporidium may be present in the source water or the finished water, the report must include:

(i) A summary of the results of the monitoring; and

(ii) An explanation of the significance of the results.

(b) If the system has performed any monitoring for radon which indicates that radon may be present in the finished water, the report must include:

(i) The results of the monitoring; and

(ii) An explanation of the significance of the results.

(c) If the system has performed additional monitoring which indicates the presence of other contaminants in the finished water, EPA strongly encourages systems to report any results which may indicate a health concern. To determine if results may indicate a health concern, EPA recommends that systems find out if EPA has proposed a regulation or issued a health advisory for that contaminant by calling the Safe Drinking Water Hotline (800-426-4791). EPA considers detects above a proposed MCL or health advisory level to indicate possible health concerns. For such contaminants, EPA recommends that the report include:

(i) The results of the monitoring; and

(ii) An explanation of the significance of the results noting the existence of a health advisory or a proposed regulation.

(6) Compliance with UPDWR.

In addition to the requirements of R309-225-5(4)(f), the report must note any violation that occurred during the year covered by the report of a requirement listed below, and include a clear and readily understandable explanation of the violation, any potential adverse health effects, and the steps the system has taken to correct the violation.

(a) Monitoring and reporting of compliance data;

(b) Filtration and disinfection prescribed by R309-505 of this part. For systems which have failed to install adequate filtration or disinfection equipment or processes, or have had a failure of such equipment or processes which constitutes a violation, the report must include the following language as part of the explanation of potential adverse health effects: Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

(c) Lead and copper control requirements prescribed by R309-210-6. For systems which fail to take one or more actions prescribed by R309-210-6(1)(c), R309-210-6(2), or R309-210-6(4), the report must include the applicable language in R309-220-14 for lead, copper, or both.

(d) Treatment techniques for Acrylamide and Epichlorohydrin prescribed by R309-215-8. For systems which violate the requirements of R309-215-8, the report must include the relevant language from R309-220-14.

(e) Recordkeeping of compliance data.

(f) Special monitoring requirements prescribed by 40 CFR section 141.40 (unregulated contaminants); and

(g) Violation of the terms of a variance, an exemption, or an administrative or judicial order.

(7) Variances and Exemptions.

If a system is operating under the terms of a variance or an exemption issued under R309-100-10 or R309-100-11, the report must contain:

(a) An explanation of the reasons for the variance or exemption;

(b) The date on which the variance or exemption was issued;

(c) A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption; and

(d) A notice of any opportunity for public input in the review, or renewal, of the variance or exemption.

(8) Additional information.

(a) The report must contain a brief explanation regarding contaminants which may reasonably be expected to be found in drinking water including bottled water. This explanation may include the language of paragraphs (8)(a)(i) through (iii) or systems may use their own comparable language. The report also must include the language of paragraph (8)(a)(iv) of this section.

(i) The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

(ii) Contaminants that may be present in source water include:

(A) Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

(B) Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

(C) Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

(D) Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

(E) Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

(iii) In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

(iv) Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

(b) The report must include the telephone number of the owner, operator, or designee of the community water system as a source of additional information concerning the report.

(c) In communities with a large proportion of non-English speaking residents, as determined by the Director, the report must contain information in the appropriate language(s) regarding the importance of the report or contain a telephone number or address where such residents may contact the system to obtain a translated copy of the report or assistance in the appropriate language.

(d) The report must include information (e.g., time and place of regularly scheduled board meetings) about opportunities for public participation in decisions that may affect the quality of the water.

(e) The systems may include such additional information as they deem necessary for public education consistent with, and not detracting from, the purpose of the report.

(f) Systems required to comply with R309-215-16.

(i) Any ground water system that receives notice from the Director of a significant deficiency or notice from a laboratory of a fecal indicator-positive ground water source sample that is not invalidated by the Director under R309-215-16(2)(d) must inform its customers of any significant deficiency that is uncorrected at the time of the next report or of any fecal indicator-positive ground water source sample in the next report. The system must continue to inform the public annually until the Director determines that particular significant deficiency is corrected or the fecal contamination in the ground water source is addressed under R309-215-16(3)(a). Each report must include the following elements.

(A) The nature of the particular significant deficiency or the source of the fecal contamination (if the source is known) and the date the significant deficiency was identified by the Director or the dates of the fecal indicator-positive ground water source samples;

(B) If the fecal contamination in the ground water source has been addressed under R309-215-16(3)(a) and the date of such action;

(C) For each significant deficiency or fecal contamination in the ground water source that has not been addressed under R309-215-16(3)(a), the Director-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed; and

(D) If the system receives notice of a fecal indicator-positive ground water source sample that is not invalidated by the Director under R309-215-16(2)(d), the potential health effects using the health effects language of Appendix A of subpart O.

(ii) If directed by the Director, a system with significant deficiencies that have been corrected before the next report is issued must inform its customers of the significant deficiency, how the deficiency was corrected, and the date of correction under paragraph (8)(f)(i) of this section.

R309-225-6. Required Additional Health Information.

(1) All reports must prominently display the following language:

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from

infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

(2) A system which detects arsenic at levels above 5 micrograms per liter, but below the MCL:

(a) Must include in its report a short informational statement about arsenic, using language such as: While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

(b) May write its own educational statement, but only in consultation with the Director.

(3) A system which detects nitrate at levels above 5 mg/L, but below the MCL:

(a) Must include a short informational statement about the impacts of nitrate on children using language such as: Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

(b) May write its own educational statement, but only in consultation with the Director.

(4) Every report must include the following lead-specific information:

(a) A short informational statement about lead in drinking water and its effects on children. The statement must include the following information:

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. {NAME OF UTILITY} is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and

steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

(b) A system may write its own educational statement, but only in consultation with the Director.

(5) Community water systems that detect TTHM above 0.080 mg/L (milligrams per liter), but below the MCL in R309-200-5(3)(c), as an annual average, monitored and calculated under the provisions of R309-210-8, must include health effects language for TTHMs prescribed in R309-220-14.

(6) Beginning in the report due by July 1, 2002 and ending January 22, 2006, a community water system that detects arsenic above 0.01 milligrams per liter and up to and including 0.05 milligrams per liter must include the arsenic health effects language prescribed in R309-220-14.

R309-225-7. Report Delivery and Recordkeeping.

(1) Except as provided in paragraph (7) of this section, each community water system must mail or otherwise directly deliver one copy of the report to each customer.

(2) The system must make a good faith effort to reach consumers who do not get water bills, using means recommended by the Director. EPA expects that an adequate good faith effort will be tailored to the consumers who are served by the system but are not bill-paying customers, such as renters or workers. A good faith effort to reach consumers would include a mix of methods appropriate to the particular system such as: Posting the reports on the Internet; mailing to postal patrons in metropolitan areas; advertising the availability of the report in the news media; publication in a local newspaper; posting in public places such as cafeterias or lunch rooms of public buildings; delivery of multiple copies for distribution by single-biller customers such as apartment buildings or large private employers; delivery to community organizations.

(3) No later than the date the system is required to distribute the report to its customers, each community water system must mail a copy of the report to the Director, followed within 3 months by a certification that the report has been distributed to customers, and that the information is correct and consistent with the compliance monitoring data previously submitted to the Director.

(4) No later than the date the system is required to distribute the report to its customers, each community water system must deliver the report to any other agency or clearinghouse identified by the Director.

(5) Each community water system must make its reports available to the public upon request.

(6) Each community water system serving 100,000 or more persons must post its current year's report to a publicly-accessible site on the Internet.

(7) The Governor has waived the requirement of paragraph (a) of this section for community water systems serving fewer than 10,000 persons.

(a) Such systems must:

(i) Publish the reports in one or more local newspapers serving the area in which the system is located;

(ii) Inform the customers that the reports will not be mailed, either in the newspapers in which the reports are published or by other means approved by the Director; and

(iii) Make the reports available to the public upon request.

(b) Systems serving 500 or fewer persons may forego the requirements of paragraphs (7)(a)(i) and (ii) of this section if they provide notice at least once per year to their customers by mail, door-to-door delivery or by posting in an appropriate location that the report is available upon request.

(8) Any system subject to this rule must retain copies of its consumer confidence report for no less than 3 years.

R309-225-8. Major Sources of Contaminants in Drinking Water.

Microbiological Contaminants

(1) Total Coliform Bacteria - Naturally present in the environment.

(2) Fecal coliform and E. coli - Human and animal fecal waste.

(3) Fecal Indicators (enterococci or coliphage) - Human and animal fecal waste.

(4) Turbidity- Soil runoff.

(5) Total organic carbon - Naturally present in the environment.

Radioactive Contaminants

(6) Alpha emitters (pCi/l) - Erosion of natural deposits.

(7) Beta/photon emitters (mrem/yr) - Decay of natural and man-made deposits.

(8) Combined radium (pCi/l) - Erosion of natural deposits.

(9) Uranium (ug/l) - Erosion of natural deposits.

Inorganic Contaminants

(10) Antimony (ppb) - Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder.

(11) Arsenic (ppb) - Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.

(12) Asbestos (MFL) - Decay of asbestos cement water mains; Erosion of natural deposits.

(13) Barium (ppm) - Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.

(14) Beryllium (ppb) - Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace, and defense industries.

(15) Cadmium (ppb) - Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; runoff from waste batteries and paints.

(16) Chromium (ppb) - Discharge from steel and pulp mills; Erosion of natural deposits.

(17) Copper (ppm) - Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives.

(18) Cyanide (ppb) - Discharge from steel/metal factories; Discharge from plastic and fertilizer factories.

(19) Fluoride (ppm) - Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.

(20) Lead (ppb) - Corrosion of household plumbing systems; Erosion of natural deposits.

(21) Mercury (inorganic) (ppb) - Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland.

(22) Nitrate (as Nitrogen) (ppm) - Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.

(23) Nitrite (as Nitrogen) (ppm) - Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.

(24) Selenium (ppb) - Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines.

(25) Thallium (ppb) - Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories.

Synthetic Organic Contaminants including Pesticides and Herbicides

(26) 2,4-D (ppb) - Runoff from herbicide used on row crops.

(27) 2,4,5-TP (Silvex)(ppb) - Residue of banned herbicide.

(28) Acrylamide - Added to water during sewage/wastewater treatment.

(29) Alachlor (ppb) - Runoff from herbicide used on row crops.

(30) Atrazine (ppb) - Runoff from herbicide used on row crops.

(31) Benzo(a)pyrene (PAH) (nanograms/l) -Leaching from linings of water storage tanks and distribution lines.

(32) Carbofuran (ppb) - Leaching of soil fumigant used on rice and alfalfa.

(33) Chlordane (ppb) - Residue of banned termiticide.

(34) Dalapon (ppb) - Runoff from herbicide used on rights of way.

(35) Di(2-ethylhexyl) adipate (ppb) - Discharge from chemical factories.

(36) Di(2-ethylhexyl) phthalate (ppb) - Discharge from rubber and chemical factories.

(37) Dibromochloropropane (ppt) - Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards.

(38) Dinoseb (ppb) - Runoff from herbicide used on soybeans and vegetables.

(39) Diquat (ppb) - Runoff from herbicide use.

(40) Dioxin (2,3,7,8-TCDD) (ppq) - Emissions from waste incineration and other combustion; Discharge from chemical factories.

(41) Endothall (ppb) - Runoff from herbicide use.

(42) Endrin (ppb) - Residue of banned insecticide.

(43) Epichlorohydrin - Discharge from industrial chemical factories; An impurity of some water treatment chemicals.

(44) Ethylene dibromide (ppt) - Discharge from petroleum refineries.

(45) Glyphosate (ppb) - Runoff from herbicide use.

(46) Heptachlor (ppt) - Residue of banned pesticide.

(47) Heptachlor epoxide (ppt) - Breakdown of heptachlor.

(48) Hexachlorobenzene (ppb) - Discharge from metal refineries and agricultural chemical factories.

(49) Hexachlorocyclopentadiene (ppb) - Discharge from chemical factories.

(50) Lindane (ppt) - Runoff/leaching from insecticide used on cattle, lumber, gardens.

(51) Methoxychlor (ppb) - Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock.

(52) Oxamyl (Vydate)(ppb) - Runoff/leaching from insecticide used on apples, potatoes and tomatoes.

(53) PCBs (Polychlorinated biphenyls) (ppt) - Runoff from landfills; Discharge of waste chemicals.

(54) Pentachlorophenol (ppb) - Discharge from wood preserving factories.

(55) Picloram (ppb) - Herbicide runoff.

(56) Simazine (ppb) - Herbicide runoff.

(57) Toxaphene (ppb) - Runoff/leaching from insecticide used on cotton and cattle.

Volatile Organic Contaminants

(58) Benzene (ppb) - Discharge from factories; Leaching from gas storage tanks and landfills.

(59) Bromate (ppb) - By-product of drinking water chlorination.

(60) Carbon tetrachloride (ppb) - Discharge from chemical plants and other industrial activities.

(61) Chloramines (ppm) - Water additive used to control microbes.

(62) Chlorine (ppm) - Water additive used to control microbes.

(63) Chlorite (ppm) - By-product of drinking water chlorination.

(64) Chlorine dioxide (ppb) - Water additive used to control microbes.

(65) Chlorobenzene (ppb) - Discharge from chemical and agricultural chemical factories.

(66) o-Dichlorobenzene (ppb) - Discharge from industrial chemical factories.

(67) p-Dichlorobenzene (ppb) - Discharge from industrial chemical factories.

(68) 1,2-Dichloroethane (ppb) - Discharge from industrial chemical factories.

(69) 1,1-Dichloroethylene (ppb) - Discharge from industrial chemical factories.

(70) cis-1,2-Dichloroethylene (ppb) - Discharge from industrial chemical factories.

(71) trans-1,2-Dichloroethylene (ppb) - Discharge from industrial chemical factories.

(72) Dichloromethane (ppb) - Discharge from pharmaceutical and chemical factories.

(73) 1,2-Dichloropropane (ppb) - Discharge from industrial chemical factories.

(74) Ethylbenzene (ppb) - Discharge from petroleum refineries.

(75) Haloacetic Acids (HAA) (ppb) - By-product of drinking water disinfection.

(76) Styrene (ppb)- Discharge from rubber and plastic factories; Leaching from landfills.

(77) Tetrachloroethylene (ppb) - Discharge from factories and dry cleaners.

(78) 1,2,4-Trichlorobenzene (ppb) - Discharge from textile-finishing factories.

(79) 1,1,1-Trichloroethane (ppb) - Discharge from metal degreasing sites and other factories.

(80) 1,1,2-Trichloroethane (ppb) - Discharge from industrial chemical factories.

(81) Trichloroethylene (ppb) - Discharge from metal degreasing sites and other factories.

(82) TTHMs (Total trihalomethanes)(ppb) - By-product of drinking water chlorination.

(83) Toluene (ppm) - Discharge from petroleum factories.

(84) Vinyl Chloride (ppb) - Leaching from PVC piping; Discharge from plastics factories.

(85) Xylenes (ppm) - Discharge from petroleum factories; Discharge from chemical factories.

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R309-300. Certification Rules for Water Supply Operators

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R309-300. Certification Rules for Water Supply Operators.

R309-300-1. Objectives.

These certification rules are established to promote use of trained, experienced, and efficient personnel in charge of public waterworks and to establish standards whereby operating personnel can demonstrate competency to protect the public health through proficient operation of waterworks facilities.

R309-300-2. Authority.

Utah's Operator Certification Program is authorized by Section 19-4-104.

R309-300-3. Extent of Coverage - To Whom Rules Apply - Effective Date.

These rules shall apply to all community and non-transient non-community drinking water systems and all public drinking water systems that utilize treatment of the drinking water. This shall include both water treatment and distribution systems.

The certification requirements shall become effective February 1, 2001 for non-transient non-community drinking water systems and for community water systems serving less than 800 population utilizing only ground water or wholesale sources. These water systems shall have until February 1, 2003 to meet these requirements. For further information on this program, contact the Division of Drinking Water, telephone 536-4200.

R309-300-4. Definitions.

"Board" see the definition of: Drinking Water Board below.

"Commission" see the definition of: Operator Certification Commission.

"Community Water System" means a public drinking water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

"Continuing Education Unit (CEU)" means ten contact hours of participation in, and successful completion of, an organized and approved continuing education experience under responsible sponsorship, capable direction, and qualified instruction. College credit in approved courses may be substituted for CEUs on an equivalency basis.

"Direct Employment" means that the operator is directly compensated by the drinking water system to operate that drinking water system.

"Direct Responsible Charge" means active on-site charge and performance of operation duties. A person in direct responsible charge is generally an operator of a water treatment plant or distribution system who independently makes decisions during normal operation which can affect the sanitary quality, safety, and adequacy of water delivered to customers. In cases where only one operator is employed by the system, this operator shall be considered to be in direct responsible charge.

"Discipline" means type of certification (Distribution or Treatment).

"Distribution System" means the use of any spring or well source, distribution pipelines, appurtenances, and facilities which carry water for potable use to consumers through a public water supply. Systems which chlorinate groundwater are in this discipline.

"Distribution System Manager" means the individual responsible for all operations of a distribution system.

"Division of Drinking Water" means the Division within the Utah Department of Environmental Quality which regulates public water supplies.

"Drinking Water Board" means the board appointed by the Governor responsible for promulgation, interpretation and enforcement of Drinking Water Rules in Utah.

"Executive Secretary" means the individual authorized by the Drinking Water Board to conduct business on its behalf. The Executive Secretary has been delegated the responsibility of conducting the necessary daily duties of the Board.

"Grade" means any one of the possible steps within a certification discipline of either water distribution or water treatment. The water distribution discipline has five steps and the water treatment discipline has four steps. Treatment Grade I and Distribution Small System indicate knowledge and experience requirements for the smallest type of public water supply. Grade IV indicates knowledge and experience levels appropriate for the largest, most complex type of public water supply.

"Grandparent Certificate" means the operator has not been issued an Operator Certificate through the examination process and that a restricted certificate has been issued to the operator which is limited to his current position and system. These certificates cannot be used with any other system should the operator transfer.

"Non-Transient Non-Community Water System" means a public water system that is not a community water system and that regularly serves at least 25 of the same persons for more than six months per year. Examples are separate systems serving workers and schools.

"Training Coordinating Committee" means the voluntary association of individuals responsible for environmental training in the state of Utah.

"Operator" means a person who operates, repairs, maintains, and is directly employed by or an appointed volunteer for a public drinking water system.

"Operator Certification Commission" means the Commission appointed by the Drinking Water Board as an advisory Commission on certification.

"Public Drinking Water System" means any drinking water system, either publicly or privately owned, that has at least 15 connections or serves at least 25 people for at least 60 days a year.

"Regional Operator" means a certified operator who is in direct responsible charge of more than one public drinking water system.

"Restricted Certificate" means that the operator has qualified by passing an examination but is in a restricted certification status due to lack of experience as an operator.

"Secretary" means the Secretary to the Operator Certification Commission. This is an individual appointed by the Executive Secretary to conduct the business of the Commission.

"Specialist" means a person who has successfully passed the written certification exam and meets the required experience, but who is not in direct employment with a Utah public drinking water system.

"Treatment Plant Manager" means the individual responsible for all operations of a treatment plant.

"Treatment Plant" means those facilities capable of delivering complete treatment to any water (the equivalent of coagulation and/or filtration) serving a public drinking water supply.

"Unrestricted Certificate" means that a certificate of competency has been issued by the Board on the recommendation of the Commission. This certificate implies that the operator has passed the appropriate level written examination and has met all certification requirements at the discipline and grade stated on his certificate.

R309-300-5. General Policies.

1. In order to become a certified water operator or specialist, an individual shall pass an examination administered by the Division of Drinking Water or qualify for the grandparent provisons outlined in R309-300-13.

2. Any properly qualified operator (see Minimum Required Qualifications for Utah Waterworks Operators Table 5) may apply for unrestricted certification.

3. Any properly qualified person (see Minimum Required Qualifications for Water System Specialists Table 6) may apply for Specialist certification. A Specialist, regardless of discipline or grade, shall not act as a direct responsible charge operator, or be in direct operation or supervise the direct operation of, any public drinking water system.

4. An individual who holds a current Specialist Certificate may apply for an Operator Certificate of the same discipline and grade upon verification of direct employment with a public drinking water system. An individual who holds a current Operator Certificate (Restricted and Unrestricted) may apply for a Specialist Certificate of the same discipline and grade if that operator leaves the direct employment of a drinking water system.

5. All direct responsible charge operators shall be certified at a minimum of the grade level of the water system with an appropriate certificate. Where 24-hour shift operation is used or required, one operator per shift must be certified at the classification of the system operated.

6. The Board, upon recommendation from the Commission, may waive examination of applicants holding a valid certificate or license issued in compliance with other state certification plans having equivalent standards, and grant reciprocity.

7. A grandparent certificate will require normal renewal as with other certificates and will be restricted to the existing position, person, and system for which it was issued. No further examination will be required unless the grade of the drinking water system increases or the operator seeks to change the certificate discipline or grade. At that time, all normal certification requirements must be met.

8. Every community and non-transient non-community drinking water system and all public systems that utilize treatment of the drinking water shall have at least one operator certified at the classified grade of the water system. The certification requirements for non-transient non-community drinking water systems and for community water systems serving less than 800 population, serving only ground water, shall be met by February 1, 2003. Certification must be appropriate for the type of system operated (treatment and/or distribution).

9. An individual who is issued an Operator Certificate shall be employed by, or an appointed volunteer for, a public drinking water supply located in Utah.

10. If the Distribution or Treatment Plant Manager is changed or leaves a particular water system, the water system management must notify the Secretary to the Operator Certification Commission within ten days by contacting the Division of Drinking Water in writing. Within one year, or four examination cycles, whichever is longer, the operator

in the position of plant or system manager that requires certification must have passed an examination of the appropriate grade and discipline. Direct responsible charge experience may be gained later, together with unrestricted certification as experience is gained.

11. The Secretary to the Commission may suspend or revoke a certificate after due notice and opportunity for a hearing. See Section R309-300-9 for further details.

12. An operator may have the opportunity to take any grade of examination higher than the rating of the system which he operates. If passed, the operator shall be issued a restricted certificate at that higher grade. This certificate can be used to demonstrate that the operator has successfully passed all knowledge requirements for that discipline and grade, but that experience is lacking. This restricted certificate will become unrestricted when the experience requirements are met with written verification for the appropriate discipline and grade, provided it is renewed at the required intervals.

13. The Commission will review on a periodic basis each system's compliance with these rules and will refer those systems in violation to the Board for appropriate action. Any requirement can be appealed to the Board where unusual conditions warrant an exemption. Formal action in these areas will be taken on each case. The Commission will work closely with water system managements to ensure that efforts are underway to meet the requirements of these rules.

14. An operator who is acting as the direct responsible charge operator for more than one drinking water system (regional operator) shall not be a grandparent certified operator.

15. The regional operator must have an unrestricted certificate equal to or higher than the grade and discipline of the rating applied to each system he is operating.

16. If the regional operator is operating any system(s) that have both disciplines involved in their rating, the operator must have unrestricted certificates in both disciplines and at the highest grade of the most complex system he is working with.

17. A regional operator shall be within a one hour travel time, under normal work and home conditions, of each drinking water system for which he is considered in direct responsible charge unless a longer travel time is approved by the Operator Certification Commission based on availability of certified operators and the distance between community water systems in the area.

18. If the drinking water system has only one certified operator, with the exception of a drinking water system employing a regional operator, the operator must have a back up operator certified in the required discipline(s) and not more than one grade lower than the drinking water system's grade. The back up certified operator must be within one hour travel time of the drinking water system.

19. At no time will an uncertified operator be allowed to operate a drinking water system covered by these rules.

R309-300-6. Application for Examination.

1. Prior to taking an examination, the operator or specialist must file a written application with the Division of Drinking Water, accompanied by evidence of his qualifications for certification in accordance with provisions of this plan (see tables on minimum qualifications). Such applications shall be made on forms supplied by the Division.

2. An operator may elect to challenge any written examination which he believes can be successfully passed. Persons passing such a challenged examination shall be issued restricted certificates for the appropriate discipline and grade.

R309-300-7. Examinations.

1. The time and place of the examination to qualify for a certificate shall be determined by the Commission. All examinations for certification shall be given not less than twice a year, generally at each of 12 district health department offices. All examinations will be conducted on the same day, graded, and the applicant notified of the results within 30 days. If an operator taking the examination fails to pass, he may file an application for reexamination at the next available date.

2. The minimum passing grade for all certification exams shall be 70 percent correct on all questions asked.

3. An individual who has failed to pass at least two consecutive written exams, at the same grade level and discipline, may appeal the results by making an application for an oral exam. The oral exam will be administered by at least two Commission members. If the individual fails this exam, he will be given written notice of those areas deficient and asked to reapply for a written examination.

4. Examinations will be given in nine grades, four in water treatment and five water distribution. The examinations will cover, but not be limited to, the following areas:

(a) general water supply knowledge;

(b) control processes in water treatment or distribution;

(c) operation, maintenance, and emergency procedures in treatment or distribution;

(d) proper record keeping;

(e) laws and requirements, and water quality standards.

5. The written examination for specialist certification will be the same examination that is given for operator certification.

6. The written examination question bank and text matrix shall be reviewed periodically by the Commission.

R309-300-8. Certificates.

1. All certificates shall indicate the discipline for which they were issued as follows:

(a) Water Treatment Plant Operator, Unrestricted;

(b) Water Treatment Plant Operator, Restricted;

(c) Water Distribution Operator, Unrestricted;

(d) Water Distribution Operator, Restricted;

(e) Water Treatment Specialist;

(f) Water Distribution Specialist;

(g) Small System, Unrestricted;

(h) Small System, Restricted;

(i) Grandparent.

2. A restricted certificate will be issued to those operators who have passed a higher grade examination than the grade for which they have qualified in the experience category. Upon accumulating the necessary experience (see R309-300-19. Table 5 and Table 6), these restricted certificates will become unrestricted with the same renewal date. Certificates issued in the restricted status will be stamped with the word RESTRICTED on the bottom left corner of the certificate.

3. Grandparent certificates will be restricted to the person, position, and water system for which they were issued. These certificates will exempt the holder from further examination but will not be transferable to other persons, drinking water systems or positions.

4. A Specialist Certificate will be issued to those persons who have met the experience requirements and have successfully passed the written examination, but who are not in direct employment with a Utah Public Drinking Water System or in the case of requested conversion (see R309-300-8(5)).

5. An individual who currently holds a valid Utah Operator Certificate and who is no longer directly employed by a Utah drinking water system may request his Operator Certificate be converted to a Specialist Certificate with the same expiration date.

6. All certificates shall continue in effect for a period of three years unless suspended or revoked prior to that time. The certificate must be renewed every three years by payment of a renewal fee and evidence of required training (see R309-300-14). Certificates will expire on December 31, three years from the year of issuance.

7. Failure to remain active in the waterworks field during the three-year life of the Operator Certificate can be cause for denial of the application renewal.

8. Requests for renewal shall be made on the forms supplied by the Division of Drinking Water.

9. A lapsed certificate may be renewed within 6 months of the expiration date, by payment of the reinstatement fee or passing an examination. After the first six months from the expiration date, the operator shall have one year to appeal to the Operator Certification Commission for renewal of the certificate. After considering the training, experience, education and progress made since the certificate lapsed, the Commission may grant reinstatement without examination.

R309-300-9. Certificate Suspension and Revocation Procedures.

1. When the Secretary is considering the suspension or revocation of an Operator's or Specialist's certificate, the individual shall be so informed in writing. The communication shall state the reasons for considering such action and allow the individual an opportunity for a hearing.

2. Grounds for suspending or revoking an Operator's or a Specialist's certificate shall be any of the following:

(a) demonstrated disregard for the public health and safety;

(b) misrepresentation or falsification of figures and reports, or both, submitted to the State;

(c) cheating on a certification exam.

3. Suspension or revocation will be possible when it can be shown that the circumstances and events were under an Operator's or a Specialist's jurisdiction and control. Disasters or "acts of God" which could not be reasonably anticipated will not be grounds for a suspension or a revocation action.

4. Following an appropriate hearing on these matters, the Commission will take formal action. This action shall include a description of the findings of fact to be placed in the Operator's or the Specialist's certification file and mailed to the Operator or the Specialist involved. This communication shall also state the lengths of suspension or revocation, and the procedures to reapply for certification at the end of the specified disciplinary period.

5. Any suspension or revocation may be appealed to the Drinking Water Board by filing a request for a hearing with the Executive Secretary. The Executive Secretary shall place this matter on the agenda of the next regular meeting and so inform the appellant. The request for a hearing must be received by the Executive Secretary at least 14 calendar days prior to a scheduled Board meeting in order to be placed on the Board's agenda.

R309-300-10. Fees.

1. Fees for operator and specialist certification shall be submitted in accordance with Section 63-38-3.

2. Examination fees from applicants who are rejected before examination will be returned to the applicant.

3. Application fees will not be returned.

R309-300-11. Facilities Classification System.

1. All treatment plants and distribution systems shall be classified in accordance with R309-300-19.

2. Classification will be made by either the point system or on a population-served basis, whichever results in a higher classification.

3. When the classification of a system is upgraded or added to existing system ratings, the Secretary to the Commission will make a decision on the timing to be allowed for operators to gain certification at the higher or different level.

R309-300-12. Qualifications of Operators.

1. Minimum qualifications are outlined in Minimum Required Qualifications for Utah Waterworks Operators, Table 5, and Minimum Certification Qualifications for Water System Specialists, Table 6, included with these rules (see Section R309-300-19).

2. Approved high school equivalencies can be substituted for the high school graduation requirement.

3. Education of an operator can be substituted for experience, but no more than 50 percent of the experience may be satisfied by education. Note: The exception to this is in grades I and II, where the "one year of experience" requirement cannot be reduced by any amount of education.

4. Education of a specialist cannot be substituted for the required experience (see Minimum Certification Qualifications for Water System Specialists Table 6).

R309-300-13. Grandparent Certification Criteria.

1. The owner of a non-transient non-community drinking water system or a community water system serving 800 or less population and which utilizes only groundwater or wholesale sources may apply for Grandparent certification for the operators in direct responsible charge of their water system by February 1,2003.

2. Applications for grandparent certification shall be made on applications supplied by the Division of Drinking Water. The applications must be received by the Division of Drinking Water no later than the date listed above, thereafter applications for grandparent certifications will not be accepted.

3. Grandparent certificate will be available for community and non-transient non-community water systems that serve a population of 800 or less and to operators who meet the following criteria:

(a) System serving 500 or less population (Small System operator):

(i) The operator shall have at least 3 years experience operating the water system for which grandparent certification is being applied for.

(ii) The operator shall have operated the water system in compliance with the Utah Public Drinking Water Rules (R309-100 through R309-820) for the most recent 3 year time period. Compliance shall mean that the system shall not have at any time exceeded the 75 percent of allowable number of Improvement Priority points allowed for an "Approved" water system in R309-400. For purposes of compliance determination for grandparent certification qualification only, points assessed for capital improvements that exceed a cost of $1,000 will be excluded from the total.

(b) System serving 501 to 800 population (Distribution I operator):

(i) The operator shall have at least 5 years experience operating the water system for which grandparent certification is being applied for.

(ii) The operator shall have operated the water system in compliance with the Utah Public Drinking Water Rules (R309-100 through R309-820) for the most recent 5 year time period. Compliance shall mean that the system shall not have at any time exceeded the 75 percent of allowable number of Improvement Priority points allowed for an "Approved" water system in R309-400. For purposes of compliance determination for grandparent certification qualification only, points assessed for capital improvements that exceed a cost of $1,000 will be excluded from the total.

4. If an operator is denied certification through the Grandparent process, the decision may be appealed as outlined in R309-300-9(4) and R309-300-9(5) of these rules.

R309-300-14. CEUs and Approved Training.

1. CEUs will be required for renewal of all certificates (grandparent, restricted and unrestricted) according to the following schedule:

TABLE 1	
CLASSIFICATION	CEUs REQUIRED IN A 3 YEAR PERIOD
Small System	2
Grade 1	2
Grade 2	2
Grade 3	3
Grade 4	3

2. Grandparent certificates are required to have 2.0 or 3.0 CEUs, as per the water system classification, for certificate renewal. Grandparent certificates issued after the calendar year of 2000 are required to obtain 0.7 CEUs of an approved pre-exam training course as part of the 2.0 CEU renewal requirement. These specific CEUs shall be obtained during the first renewal cycle of said certificate.

3. Groups that currently sponsor approved education activities in Utah are:

The Rural Water Association of Utah;

Salt Lake Community College

Utah Valley State College;

Utah State University at Logan;

Utah Department of Environmental Quality;

Manufacturer's Representatives;

American Water Works Association;

American Backflow Prevention Association.

4. A continuing education unit is defined as 10 contact hours of participation in, and successful completion of, an organized and approved training education experience under qualified instruction.

5. College level education is accepted in drinking water related disciplines upon approval of the Secretary to the Commission as to CEU credits (1 quarter credit hour will equal 1.0 CEU or 1 semester credit hour will equal 1.5 CEUs).

6. All CEUs for certificate renewal shall be subject to review for approval to insure that the training is applicable to waterworks operation and meets CEU criteria. Identification of approved training, appropriate CEU or credit assignment and verification of successful completion is the responsibility of the Secretary to the Commission. Training records will be maintained by the Division of Drinking Water.

7. All in-house or in-plant training which is intended to meet any part of the CEU requirements must be approved by the Secretary to the Commission in writing prior to the training.

8. In-house or in-plant training submitted to the Secretary of the Commission must meet the following general criteria to be approved:

(a) Instruction must be under the supervision of an approved instructor.

(b) An outline must be submitted of the subjects to be covered and the time to be allotted to each area.

(c) A list of the teacher's objectives shall be submitted which will document the essential points of the instruction ("need-to-know" information) and the methods used to illustrate these principles.

9. One CEU credit will be given for registration and attendance at the annual technical program meeting of the American Water Works Association (AWWA), the Intermountain Section of AWWA, the Rural Water Association of Utah, or the National Rural Water Association.

R309-300-15. Validation of Previously Issued Certificates.

1. All current certificates issued by the Executive Secretary will remain in effect until their stated date of expiration and may be renewed at any time before this date in

accordance with the rules established herein. Certificates will be issued for a three-year period.

2. Those individuals who were issued Grandparent Certificates and subsequently passed an examination within the same discipline, at the same grade, or a higher grade will be issued a new unrestricted certificate which will nullify the existing "Grandparent " certificate.

R309-300-16. Operator Certification Commission.

1. An Operator Certification Commission shall be appointed by the Drinking Water Board from recommendations made by the cooperating agencies. Cooperating agencies are the Utah Department of Environmental Quality, the Utah League of Cities and Towns, the Training Coordinating Committee of Utah, the Intermountain Section of the American Water Works Association, the Civil or Environmental Engineering Departments of Utah's Universities, and the Rural Water Association of Utah.

2. The Commission is charged with the responsibility of conducting all work necessary to promote the program, recommend certification of operators, and oversee the maintenance of records.

3. The Commission shall consist of seven members as follows:

(a) One member shall be a certified operator from a town having a population under 10,000 and will be nominated by the Rural Water Association of Utah.

(b) One member shall be at least a grade III unrestricted certified distribution operator and will be nominated by the American Water Works Association.

(c) One member shall be at least a grade III unrestricted certified water treatment plant operator and will be nominated by the American Water Works Association.

(d) One member shall represent municipal water supply management and will be nominated by the Utah League of Cities and Towns.

(e) One member shall represent the civil or environmental engineering department of a Utah university cooperating with the certification program.

(f) One member shall represent water supply trainers and will be nominated by the Training Coordinating Committee (TCC).

(g) One member shall be a representative for the Drinking Water Board.

4. Each group represented shall designate its nominee to the Drinking Water Board for a three-year term. Nominations may be accepted or rejected by the Drinking Water Board.

Persons may be renominated for successive three-year terms by their sponsor groups. The Executive Secretary for the Drinking Water Board shall notify the sponsoring groups one year in advance of the termination of the Commission member that a nominee will be needed. The initial Commission at its first meeting will draw lots corresponding to one, two, and three-year terms. Thereafter, all Commission member terms will be for three years on a staggered replacement basis. An appointment to succeed a Commission member who is unable to serve his full term shall be only for the remainder of the unexpired term and shall be submitted by the sponsor groups and approved by the Drinking Water Board as mentioned above.

5. Each year the Commission shall elect from its membership a chairperson and vice-chairperson and such other officers as may be needed to conduct its business.

6. It shall be the duty of the Commission to advise in the preparation of examinations for various grades of operators and advise on the certification criteria used by the Secretary. In addition to these duties, the Commission shall also advertise and promote the program, distribute applications and notices, maintain a register of certified Operators and Specialists, set examination dates and locations, and make recommendations regarding each drinking water system's compliance with these rules.

R309-300-17. Secretary to the Commission.

The Executive Secretary of the Drinking Water Board shall designate a non-voting member of the Commission to serve as its Secretary, who shall be a senior public health representative from the Division of Drinking Water. This Secretary shall serve to coordinate the paperwork for the Commission and to bring issues before the Commission. His duties consist of the following:

1. acting as liaison between the Commission and the water suppliers, and generally promote the program;

2. maintaining records necessary to implement these rules;

3. classifying all water treatment plants and distribution systems;

4. notifying sponsor groups of Commission nominations needed;

5. coordinating with Utah's Training Coordinating Committee (TCC) to ensure adequate operator training opportunities throughout the state;

6. serving as a source of public information for operator training opportunities and certified operators available for employment;

7. receiving applications for certification and screen, investigate, verify and evaluate all applications received consistent with policies set by the Board and Commission;

8. bringing issues to the Commission for their review;

9. developing and administering operator certification examinations.

R309-300-18. Non-compliance with Certification Program.

1. After appropriate consideration by the Commission, cases of non-compliance will be referred to the Drinking Water Board for appropriate enforcement action.

2. Non-compliance with the certification rules is a violation of R309-102-8. Whenever such a violation occurs, the water system management will be notified in writing by the Division of Drinking Water and will be required to correct the situation.

R309-300-19. Drinking Water System Classification.

This system applies only to those public water supplies operating coagulation and/or filtration treatment plants. This classification system does not apply to those systems operating only chlorination facilities on distribution systems.

TABLE 2		
	ITEM	**POINTS**
SIZE	Maximum population served, peak day	1 pt. per 5,000 or part thereof
	Design flow (avg. day) or peak month's	1 pt. per MGD or part thereof
WATER SUPPLY SOURCES	Groundwater	3
	Surface water	5
	Average raw water quality (0-10)	
	Little or no variation	0
	Raw water quality (other than turbidity) varies enough to require treatment changes less than 10% of the time	2
	Raw water quality including turbidity varies often enough to require frequent changes in the treatment process	5
	Raw water quality is subject to major changes and may be subject to periodic serious pollution	10

TREATMENT	Aeration for or with CO2	2
	pH adjustment	4
	Packed tower aeration	6
	Stability or corrosion control	4
	Taste and odor control	8
	Color control	4
	Iron or Iron/Mn, removal	10
	Ion exchange softening	10
	Chemical precipitation	
	Softening	20
	Coagulant addition	4
	Flocculation	6
	Sedimentation	5
	Upflow clarification	14
	Filtration	10
	Disinfection (0-10)	
	No disinfection	0
	Chlorination or comparable	5
	On-site generation of disinfectant	5
	Special processes (including reverse osmosis, electrodialysis, etc.	15
	Sludge/backwash waterdisposal (0-5)	
	No disposal to raw water source	0
	Any disposal to raw water source	2
	Any disposal to plant raw water	5
LABORATORY	**Laboratory control, Biological (0-10)**	
	All lab work done outside of plant	0
	Colilert process	2
	Membrane filter	3
	Multiple tube of fecal determination	5
	Biological identification	7
	Viral studies or similarly complex work done on-site	10
	Laboratory control, Chemical/physical (0-10)	
	All lab work done outside of plant	0
	Push button or colorimetric methods such as chlorine residual or pH	3

	Additional procedures such as titrations or jar tests	5
	More advanced determinations such as numerous organics	7
	Highly sophisticated instrumentation such as atomic absorption or gas chromatography	10

TABLE 3
SUMMARY OF UTAH
WATER UTILITY CLASSIFICATION SYSTEM
WATER TREATMENT PLANT CLASSIFICATION

GRADE	1	2	3	4
Population Served	1500 or less	1501 to 5000	5001 to 15,000	Over 15,000
Plant Points	0 – 40	41 - 65	66 - 90	91 - Up

TABLE 4
SUMMARY OF UTAH
WATER UTILITY CLASSIFICATION SYSTEM
DISTRIBUTION CLASSIFICATION

GRADE	SMALL SYSTEM	1	2	3	4
Population Served	500 or less	501 to 1500	1501 to 5000	5001 to 15,000	Over 15,000
Distribution Points	0 - 10	0 - 10	10 - 25	26 – 50	51 - Up

Distribution systems are those which use groundwater sources (springs and wells) and which may or may not use chlorination. Classification will generally be made in accordance with the following five classes. The Commission may change the classification of a particular distribution system when there are unusual factors affecting the complexity of transmission, mixing of sources, or potential health hazards

TABLE 5
MINIMUM REQUIRED QUALIFICATIONS FOR
UTAH WATERWORKS OPERATORS

	EDUCATION				**EXPERIENCE**	
Certification Grade (Both Dist and Treatment)	Degree	Associate Degree	High School	Non High School	Direct Responsible Charge Years	Total Years
4	X				2	4
4		X			2	6
4			X		4	8
4				X	5	10
3	X				1	2
3		X			1	2
3			X		2	4
3				X	3	6
2	X				0	2
2		X			0	2
2			X		0	2
2				X	0	3
1 and Small Systems	X				0	1
1 and Small Systems		X			0	1
1 and Small Systems			X		0	1
1 and Small Systems				X	0	1

Note:(1) Experience requirements apply to all operators except those who have been issued "grandparent" certificates.(2) At least one half of all experience must be gained at the grade of certification desired.

ABLE 6
Minimum Certification Qualifications
For Water System Specialists

CERTIFICATION GRADE (both Distribution and Treatment)	EXPERIENCE	
	"Hands On" Experience (Years)	Design or Associated Experience (Years)
4	8	10
3	4	8
2	2	4
1	0	0

Note:

1. All experience must be verifiable.
2. All "hands on" experience must be in the area of operation, repair, and maintenance of a public drinking water system.
3. Associated experience may be in the design, construction, and inspection of public drinking water systems and/or direct consultation for public drinking water systems.
4. The required experience, as outlined above, must be either in the "Hands On" category or in the Design or Associated category, not in combination.
5. Persons applying for and passing the specialist exam who do not meet the minimum qualifications will be issued a restricted certificate similar to the water system operator restricted certificate.
6. Restricted Specialist Certificate shall be changed to unrestricted status upon written request of certificate holder after minimum experience qualifications have been met.

KEY: drinking water, environmental protection, administrative procedure
Date of Enactment or Last Substantive Amendment: November 20, 2000
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Authorizing, and Implemented or Interpreted Law: 19-4-104; 63-46b-4

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R309-305. Certification Rules for Backflow Technicians.

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R309-305. Certification Rules for Backflow Technicians.

R309-305-1. Purpose.

These rules are established:

(1) in order to promote the use of trained, experienced professional personnel in protecting the public's health; and

(2) To establish standards for training, examination, and certification of those personnel involved with cross connection control program administration, testing, maintenance, and repair of backflow prevention assemblies. In addition to establishing standards for the instruction of Backflow Technicians.

R309-305-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(4)(a) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-305-3. Extent of Coverage.

These rules shall apply to all personnel who will be:

(1) directly involved with the administration or enforcement of any cross connection control program being administered by a drinking water system; or

(2) testing, maintaining and/or repairing any backflow prevention assembly; or

(3) instructors within the certification program, regardless of institution or program.

R309-305-4. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

(1) Backflow Technician - An individual who has met the requirements and sucessfully completed the course of instruction and certification requirements for Class I, II or III backflow technician certification as outlined herein.

(a) Class I Backflow Technician is a Cross Connection Control Program Administrator.

(b) Class II Backflow Technician is a Backflow Assembly Tester.

(c) Class III Backflow Technician is a Backflow Instructor Trainer.

(2) Class - means the level of certification of a Backflow Technician (Class I, II or III).

(3) Performance Examination - means a closed book hands on demonstration of an individuals ability to conduct a field test on backflow prevention assemblies.

(4) Proctor - means a Class III Technician authorized to administer the written or the performance examination.

(5) Renewal Course - means a course of instruction, approved by the Commission, which is a prerequisite to the renewal of a Backflow Technician's Certificate.

(6) Secretary to the Commission - means that individual appointed by the Executive Secretary to conduct the business of the Commission and to make recommendations to the Executive Secretary regarding backflow technician certification.

(7) Written Examination - means the examination for record used to determine the competency and ability of applicants in understanding of the required course of instruction.

R309-305-5. General Policies.

(1) Certification Application: Any individual may apply for certification.

(2) Certification Classes: The classes of certificates shall be: Class I, Class II, and Class III.

(a) Class I Backflow Technician - Cross Connection Control Program Administrator: This certificate shall be issued to those individuals who are directly involved in administering a cross connection control program, who have demonstrated their knowledge and ability by passing the certification examination.

(i) These individuals may NOT test, maintain or repair any backflow prevention assembly for record (except to insure proper testing techniques are being utilized within their jurisdiction).

(ii) These individuals may conduct plan/design reviews, hazard assessment investigations, compliance inspections, and enforce local laws,

codes, rules and regulations and policies within their jurisdictions, and offer technical assistance as needed.

(b) Class II Backflow Technician - Backflow Assembly Tester: This certificate shall be issued to those individuals who have demonstrated their knowledge and ability by passing the written and performance certification examinations and in addition having proven qualified and competent to test, maintain, and/or repair (see R309-305-5(3)(b)) backflow prevention assemblies (commercially as well as within their jurisdiction) by passing the practical examination.

(c) Class III Backflow Technician - Backflow Instructor Trainer: This certificate shall be issued to those individuals who have successfully completed a 3 year renewal cycle as a Class II Technician and in addition have proven qualified and competent to instruct approved Backflow Technician Certification classes by participating in and passing an approved Class III certification course.

(3) Certification Requirements: Those individuals seeking certification as a Backflow Technician must participate in an approved Technician's course of instruction and pass the examination required per class of certification.

(a) All individuals who instruct Backflow Technician training courses must hold a current Class III - Backflow Technician certificate.

(b) The issuance of a Backflow Technician certificate (Class I, II or III) does NOT authorize that individual to install or replace any backflow prevention assembly. The installation replacement or repair of assemblies must be made by a tester having appropriate licensure from the Department of Commerce, Division of Occupational and Professional Licensing, except when the Backflow Technician is an agent of the assembly owner.

R309-305-6. Technician Responsibilities.

(1) All technicians shall notify the Division of Drinking Water, local health department and the appropriate public water system of any backflow incident as soon as possible, but within eight hours. The Division can be reached during business hours at 801-536-4200 or after hours at 801-536-4123;

(2) All technicians shall notify the appropriate public water system of a failing backflow prevention assembly within five days;

(3) All technicians shall ensure that acceptable procedures are used for testing, repairing and maintaining any backflow prevention assembly;

(4) All technicians shall report the backflow prevention assembly test results to the appropriate public water system within 30 days;

(5) All technicians shall include, on the test report form, any materials or replacement parts used to effect a repair or to perform maintenance on a backflow prevention assembly;

(6) All technicians shall ensure that any replacement part is equal to or greater than the quality of parts originally supplied within the backflow prevention assembly and are supplied only by the manufacturer or their agent;

(7) All technicians shall not change the design, material, or operational characteristics of the assembly during any repair or maintenance;

(8) All technicians shall perform each test and shall be responsible for the competency and accuracy of all testing and reports thereof;

(9) All technicians shall ensure the status of their technician certification is current; and

(10) All technicians shall be equipped with and competent in the use of all tools, gauges, and equipment necessary to properly test, repair and maintain a backflow prevention assembly.

R309-305-7. Examinations.

(1) Exam Issuance: The examination recognized by the Commission for certification shall be issued through the Division of Drinking Water for both initial certification and renewal of certification.

If an individual fails an examination, the individual may file another application for reexamination on the next available test date.

(a) Examinations (both written and performance) that are used to determine competency and ability shall be approved by the Cross Connection Control Commission prior to being issued.

(b) Oral examinations may be administered to an individual who has failed to pass at least two consecutive written examinations. The oral examination shall be administered by at least one Commission member and two Class III Backflow Technicians. If the individual fails the examination, he shall be given written notification of those areas deficient.

(2) Exam Scoring: Class I, Class II and Class III Technician's must successfully complete a written exam with a score of 70% or higher. Class II Technician's must also successfully demonstrate competence and ability in the performance examination, for the testing of a Pressure Vacuum Breaker Assembly, a Spill-Resistant Pressure Vacuum

Breaker Assembly, a Double Check Valve Assembly, and a Reduced Pressure Principal Backflow Prevention Assembly.

(a) The performance examination shall be conducted by a minimum of two Class III Technicians.

(b) Each candidate must demonstrate competence and shall be evaluated by a proctor and assessed a pass or fail grade in each of the following areas.

(i) Properly identify backflow assembly

(ii) Properly identify test equipment needed

(iii) Properly connect test equipment

(iv) Test assembly

(v) Identify inaccuracies

(vi) Properly diagnose assembly problems

(vii) Properly record test results

The candidate must receive a pass grade from the proctor in all areas listed above for each assembly tested in order to pass the performance examination.

(c) An individual may apply for reexamination of either portion of the examination a maximum of two times. After a third failing grade, the individual must register for and complete another technician's course prior to any further reexamination.

(3) Class III Exam: Class III Technicians must participate in, and pass, a Class III Certification course, approved by the Cross Connection Control Commission, in addition to the successful completion of the Class II Technician's certification course.

R309-305-8. Certificates.

(1) Certificate Issuance: For a certificate to be issued, the individual must complete a Technician's training course and pass with a minimum score of 70% the written examination. For Class II and III certificates, passing marks on the performance examination shall also be required.

(2) Certificate Renewal: The Backflow Technician's certificate is issued by the Executive Secretary and shall expire December 31, three years from the year of issuance.

(a) Backflow Technician certificates shall be issued by the Commission Secretary, by delegated authority from the Drinking Water Board.

(b) The Backflow Technician's certificate may be renewed up to six months in advance of the expiration date.

(c) To renew a Class I or II Technician certificate, the Technician must register and participate in an approved backflow prevention renewal course, and pass the renewal examination (minimum score of 70%) which shall include a performance portion for Class II Certification.

(d) To renew a Class III Technician certificate, the following criteria shall be met:

(i) In the 3 year certification period a total of three events from the following list shall be obtained in any combination:

(A) Instruction at a Commission approved backflow technician certification or renewal course.

(B) Serve as a proctor for the performance examination at a Commission approved backflow technician certification or renewal course.

(ii) Attendance at a minimum of two of the annual Class III coordination meetings or receive a meeting update from the Commission Secretary.

(iii) Attendance and successful review at a Class III renewal course, as approved by the Cross Connection Control Commission. The course would consist of presentation of a randomly picked topic in backflow prevention before a peer group of other Class III technicians, and a demonstration of knowledge of all the testing equipment available by a random selection of test equipment for the technician to perform the performance exam.

(e) Should the applicant fail the renewal written examination (minimum score of 70%), renewal of that existing license shall not be allowed until a passing score is obtained. If the applicant fails to pass the test after three attempts, the applicant shall be required to participate in an approved Backflow Technician's course before retaking the written and performance examinations. (Class I Technicians only need to pass the written examination.)

(3) Certification Revocation: The Executive Secretary may suspend or revoke a Backflow Technician's certification, for good cause, including any of the following:

(a) The certified person has acted in disregard for public health or safety;

(b) The certified person has engaged in activities beyond the scope of their licensure through the Department of Commerce, Division of Professional Licensing (i.e. installation, or replacement of assemblies);

(c) The certified person has misrepresented or falsified figures or reports concerning backflow prevention assembly or test results;

(d) The certified person has failed to notify proper authorities of a failing backflow prevention assembly within five days, as required by R309-305-6(2);

(e) The certified person has failed to notify proper authorities of a backflow incident for which the technician had personal knowledge, as required by R309-305-6(1);

(f) The certified person has implemented a change of the design, material or operational characteristics of a backflow prevention assembly that is in use, and which has not been authorized by the Executive Secretary; or

(g) Disasters or "Acts of God", which could not be reasonably anticipated or prevented, shall not be grounds for suspension or revocation actions.

R309-305-9. Fees.

(1) Fees: The fees for certification shall be submitted in accordance with Section 63-38-3.2.

(2) All fees shall be deposited in a special account to defray the costs of administering the Cross Connection Control and Certification programs.

(3) Renewal Fees: The renewal fee for all classes of Technicians shall be in accordance with Section 63-38-3.2.

(4) All fees shall be deposited in a special account to defray the cost of the program.

(5) All fees are non-refundable.

R309-305-10. Training.

(1) Training: Minimum training course curriculum, written tests and performance tests shall be established by the Commission and implemented by the Secretary of the Commission for both the Technician Class I and Class II courses and the renewal courses.

(a) The length of the initial certification course for a Class I cross connection control program administrator shall be a minimum of 32 hours including examination.

(b) The length of the initial certification course for a Class II backflow assembly tester shall be a minimum of 32 hours excluding examination.

(c) The length of each renewal course shall be a minimum of 16 hours including the renewal examination (both written and performance examinations).

R309-305-11. Cross Connection Control Commission.

(1) Appointment of Members: A Cross Connection Control Commission shall be appointed by the Drinking Water Board from nominations made by cooperating agencies.

(2) Responsibility: The Commission is charged with the responsibility of conducting all work necessary to promote the cross connection program as well as recommending qualified individuals for certification, and overseeing the maintenance of necessary records.

(3) Representative Agencies: The Commission shall consist of seven members:

(a) One member (nominated by the League of Cities and Towns) shall represent a community drinking water supply.

(b) One member (nominated by the Utah Pipes Trades Education Program) shall represent the plumbing trade and must be a licensed Journeyman Plumber.

(c) One member (nominated by the Utah Mechanical Contractors Association) shall represent the mechanical trade contractors.

(d) One member (nominated by the Drinking Water Board) shall represent the Drinking Water Board.

(e) One member (nominated by the Rural Water Association of Utah) shall represent small water systems.

(f) One member (nominated by the Utah Chapter American Backflow Prevention Association) shall represent Class II Backflow Technicians and shall be a Class II or III Backflow Technician.

(g) One member (nominated by the Utah Association of Plumbing and Mechanical Officials) shall represent plumbing inspection officials and shall be a licensed plumbing inspector.

(4) Term: Each member shall serve a two year term. At the initial meeting of the Commission, lots shall be drawn corresponding to two one and three two year terms. Thereafter, all Commission members' terms shall be on a staggered basis.

(5) Nominations of Members: All nominations of Commission members shall be presented to the Drinking Water Board, which reserves the right to refuse any nomination.

(6) Unexpired Term: An appointment to succeed a Commission member who is unable to complete his full term shall be for the unexpired term only, and shall be nominated to, and appointed by, the Drinking Water Board in accordance with R309-305-11(1).

(7) Quorum: At least four Commission members shall be required to constitute a quorum to conduct the Commission's business.

(8) Officers: Each year the Commission shall elect officers as needed to conduct its business.

(a) The Commission shall meet at least once a year.

(b) All actions taken by the Commission shall require a minimum of four affirmative votes.

R309-305-12. Secretary of the Commission.

(1) Appointment: The Executive Secretary of the Drinking Water Board shall appoint, with the consent of the Commission, a staff member to function as the Secretary to the Commission. This Secretary shall serve to coordinate the business of the Commission and to bring issues before the Commission.

(2) Duties: The Secretary's duties shall be to:

(a) act as a liaison between the Commission, certified Technicians, public water suppliers, and the public at large;

(b) maintain records necessary to implement and enforce these rules;

(c) notify sponsor agencies of Commission nominations as needed;

(d) coordinate and review all cross connection control programs, certification training and the certification of Backflow Technicians;

(e) serve as a source of public information for Certified Technicians, water purveyors, and the public at large;

(f) receive and process applications for certification;

(g) investigate and verify all complaints against or concerning certified Backflow Prevention Technicians, and advise the Executive Secretary of the Drinking Water Board regarding any enforcement actions that are being recommended by the Commission;

(h) develop and administer examinations;

(i) review and correct examinations.

(3) The Secretary to the Commission is also responsible for making recommendations to the Executive Secretary regarding backflow technician certification as provided in these rules.

KEY: drinking water, cross connection control, backflow assembly tester
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R309-400. Water System Rating Criteria.

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R309-400. Water System Rating Criteria.

R309-400-1. Authority.

Under authority of Utah Code Annotated, Section 19-4-104, the Drinking Water Board adopts this rule in order to evaluate a public water system's standard of operation and service delivered in compliance with R309-100 through R309-705 hereinafter referred to as Rules.

R309-400-2. Extent of Coverage.

These rules shall apply to all public water systems as defined in R309-100.

R309-400-3. Definitions.

Approved - means that the public water system is operating in substantial compliance with all the Rules as measured by this rule.

Board - means the Drinking Water Board.

Community Water System - means a public water system which serves at least fifteen service connections used by year-round residents or regularly serves at least twenty-five year-round residents.

Contaminant - means any physical, chemical, biological, or radiological substance or matter in water.

Corrective Action - means a provisional rating for a public water system not in compliance with the Rules, but making all the necessary changes outlined by the Executive Secretary to bring them into compliance.

Executive Secretary - means the Executive Secretary of the Drinking Water Board.

Major Bacteriological Routine Monitoring Violation- means that no routine bacteriological sample was taken as required by R309-210-5(1).

Major Bacteriological Repeat Monitoring Violation - means that no repeat bacteriological sample was taken as required by R309-210-5(2)(a).

Major Chemical Monitoring Violation - means that no initial background chemical sample was taken as required in R309-515-4(5).

Maximum Contaminant Level (MCL) - The maximum permissible level of a contaminant

in water which is delivered to any user of a public water system. Individual maximum contaminant levels (MCLs) are listed in R309-200.

Minor Bacteriological Routine Monitoring Violation- means that not all of the routine bacteriological samples were taken as required by R309-210-5(1).

Minor Bacteriological Repeat Monitoring Violation - means that not all of the repeat bacteriological samples were taken as required by R309-210-5(2)(a).

Minor Chemical Monitoring Violation - means that the required chemical sample(s) was not taken in accordance with R309-205, 210 or 215.

Non-Community Water System - means a public water system that is not a community water system or a non-transient non-community water system.

Non-Transient, Non-Community Water System - means a public water system that is not a community water system and that regularly serves at least 25 of the same persons for more than six months per year. Examples are separate systems serving workers and schools.

Not Approved - means the water system does not fully comply with the Rules as measured by this rule.

Public Water System - means a system, either publicly or privately owned, providing water for human consumption and other domestic uses which has at least fifteen service connections, or regularly serves an average of at least twenty-five individuals for at least sixty days out of the year. Such term includes collection, treatment, storage and distribution facilities under control of the operator and used primarily in connection with the system. Additionally, the term includes collection, pretreatment or storage facilities used primarily in connection with system but not under such control.

Routine Chemical Monitoring Violation - means no routine chemical sample(s) was taken as required in R309-205, 210 or 215.

Sanitary Seal - A cap that prevents contaminants from entering a well through the top of the casing.

Shall - means that a particular action is obliged and has to be accomplished.

R309-400-4. Water System Ratings.

(1) The Executive Secretary shall assign a rating to each public water system in order to provide a concise indication of its condition and performance. This rating shall be assigned based on the evaluation of the operation and performance of the water system in accordance with the requirements of the Rules. Points shall be assessed to Not Approved and Corrective Action rated water systems for each violation of these requirements (R309-100

through R309-705) as the requirements apply to each individual water system. The number of points that shall be assessed are outlined in the following sections of this rule. The number of points represent the threat to the quality of the water and thereby public health.

(2) Points are assessed in the following categories: Quality, Monitoring and Public Notification; Physical Deficiencies; Operator Certification; Cross Connection Control; Drinking Water Source Protection; Administrative Issues; and Reporting and Record Maintenance.

(3) Based upon the accumulation of points, the public water system shall be assigned one of the following ratings.

(a) Approved - In order to qualify for an Approved rating, the public water system must maintain a point total less than the following:

(i) Community water system - 150 points;

(ii) Non-Transient Non-Community water system - 120 points; and

(iii) Non-Community water system - 100 points.

(b) Not Approved - In order for a public water system to receive a Not Approved rating the accumulation of points for the water system must exceed the totals listed above.

(c) Corrective Action - In order to qualify for a Corrective Action rating the public water system must submit the following:

(i) A written agreement to the Executive Secretary stating a willingness to comply with the requirements set forth in the Rules; and

(ii) A compliance schedule and time table agreed upon by the Executive Secretary outlining the necessary construction or changes to correct any physical deficiencies or monitoring failures; and

(iii) Proof of the financial ability of the water system or that the financial arrangements are in place to correct the water system deficiencies.

(iv) The Corrective Action rating shall continue until the total project is completed or until a suitable construction inspection or sanitary survey is conducted to determine the effectiveness of the improvements or the accumulation of points drops below the threshold for a not approved rating whichever is later.

(4) The water system point accumulation shall be adjusted on a quarterly basis or as current information is available to the Executive Secretary. The appropriate water system rating

shall then be adjusted to reflect the current point total.

(5) The Executive Secretary may at any time rate a water system not approved if an immediate threat to public health exists. This rating shall remain in place until such time as the threat is alleviated and the cause is corrected.

(6) Any water system may appeal its assigned rating or assessed points to the Drinking Water Board by filing a request for a hearing with the Executive Secretary. The Executive Secretary shall place this matter on the agenda of the next regular meeting and so inform the appellant. The request for a hearing must be received by the Executive Secretary at least 14 calendar days prior to a scheduled Board meeting in order to be placed on the Board's agenda.

R309-400-5. Quality, Monitoring and Public Notification Violations.

(1) Bacteriologic:

All points assessed to public water systems via this subsection are based on violations of the quality standards in R309-200-5(6); or the monitoring requirements in R309-210-5; and the associated public notification requirements in R309-220. The bacteriological assessments shall be updated on a monthly basis with the total number of points reflecting the most recent twelve month period or the most recent 4 quarters for those water systems that collect bacteriological samples quarterly.

(a) For each major bacteriological routine monitoring violation 35 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(b) For each minor bacteriological routine monitoring violation 10 points shall be assessed. For each failure to perform the associated public notification 2 points shall be assessed.

(c) For each major bacteriological repeat monitoring violation 40 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(d) For each minor bacteriological repeat monitoring violation 10 points shall be assessed. For each failure to perform the associated public notification 2 points shall be assessed.

(e) For each additional monitoring violation (R309-210-5(2)(e)) 10 points shall be assessed. For each failure to perform the associated public notification 2 points shall be assessed.

(f) For each non-acute bacteriological MCL violation (R309-200-5(6)(a)) 40 points shall be assessed. For each failure to perform the associated public notification 10 points shall be assessed.

(g) For each acute bacteriological MCL violation (R309-200-5(6)(b)) 50 points shall be assessed. For each failure to perform the associated public notification 10 points shall be assessed.

(2) Chemical:

All points assessed to public water systems via this subsection are based on violations of the quality standards in R309-200-5; or the monitoring requirements in R309-205, 210 and 215; and the associated public notification requirements in R309-220. The chemical assessments shall be updated on a quarterly basis with the total number of points reflecting the most recent compliance period unless otherwise specified. Points for any chemical MCL violation shall remain on record until the quality issue is resolved. Points for any monitoring violation shall be deleted as the required chemical samples are taken and the analytical results are reported to the Executive Secretary.

(a) Inorganic and Metal Contaminants:

(i) For each major chemical monitoring violation for inorganic and metal contaminants 20 points shall be assessed. For each failure to perform the associated public notification 3 points shall be assessed.

(ii) For each minor chemical monitoring violation for inorganic and metal contaminants 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(iii) For each MCL exceedance for inorganic and metal contaminants 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(b) Sulfate (for non-community water systems only):

(i) For each major chemical monitoring violation for sulfate 20 points shall be assessed. For each failure to perform the associated public notification 3 points shall be assessed.

(ii) For each minor chemical monitoring violation for sulfate 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(iii) For each MCL exceedance for sulfate 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be

assessed.

(c) Radiologic Contaminants:

(i) For each major chemical monitoring violation for radiological contaminants 20 points shall be assessed. For each failure to perform the associated public notification 3 points shall be assessed.

(ii) For each minor chemical monitoring violation for radiological contaminants 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(iii) For each MCL exceedance for radiological contaminants 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(d) Asbestos Contaminants:

(i) For each major chemical monitoring violation for source water or distribution system asbestos 20 points shall be assessed. For each failure to perform the associated public notification 3 points shall be assessed.

(ii) For each minor chemical monitoring violation for source water or distribution system asbestos 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(iii) For each MCL exceedance for source water or distribution system asbestos 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(e) Nitrate:

(i) For each routine chemical monitoring violation for nitrate 35 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(ii) For each MCL exceedance of nitrate 50 points shall be assessed. For each failure to perform the associated public notification 10 points shall be assessed.

(f) Nitrite:

(i) For each routine chemical monitoring violation for nitrite 35 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(ii) For each MCL exceedance of nitrite 50 points shall be assessed. For each failure to perform the associated public notification 10 points shall be assessed.

(g) Volatile Organic Chemicals:

(i) For each major chemical monitoring violation for volatile organic chemical contaminants 20 points shall be assessed. For each failure to perform the associated public notification 3 points shall be assessed.

(ii) For each minor chemical monitoring violation for volatile organic chemical contaminants 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(iii) For each MCL exceedance for volatile organic chemical contaminants 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(h) Pesticides/PCBs/SOCs

(i) For each major chemical monitoring violation for pesticide/PCB/SOC contaminants 20 points shall be assessed. For each failure to perform the associated public notification 3 points shall be assessed.

(ii) For each minor chemical monitoring violation for pesticide/PCB/SOC contaminants 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(iii) For each MCL exceedance for pesticide/PCB/SOC contaminants 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(i) Disinfection Byproducts:

(i) Total Trihalomethanes:

(A) For each routine chemical monitoring violation for total trihalomethanes 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(B) For each MCL exceedance for total trihalomethanes 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(ii) Haloacetic Acids (HAA5):

(A) For each routine chemical monitoring violation for HAA5 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(B) For each MCL exceedance for HAA5 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(iii) Bromate:

(A) For each routine chemical monitoring violation for bromate 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(B) For each MCL exceedance for bromate 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(iv) Chlorite:

(A) For each routine chemical monitoring violation for chlorite 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(B) For each MCL exceedance for chlorite 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(j) Disinfectant Residuals:

(i) Chlorine:

(A) For each routine chemical monitoring violation for chlorine 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(B) For each MCL exceedance for chlorine 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(ii) Chloramines:

(A) For each routine chemical monitoring violation for chloramines 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(B) For each MCL exceedance for chloramines 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(iii) Chlorine Dioxide:

(A) For each routine monitoring violation for chlorine dioxide 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(B) For each non-acute chlorine dioxide MCL violation 30 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(C) For each acute chlorine dioxide MCL violation 50 points shall be assessed. For each failure to perform the associated public notification 10 points shall be assessed.

(k) Lead and Copper:

(i) For each major chemical monitoring violation for lead and copper contaminants 20 points shall be assessed. For each failure to perform the associated public notification 3 points shall be assessed.

(ii) For each minor chemical monitoring violation for lead and copper contaminants 10 points shall be assessed. For each failure to perform the associated public notification 1 point shall be assessed.

(iii) A system which fails to install, by the designated deadline, optimal corrosion control if the lead or copper action level has been exceeded shall be assessed 35 points. For each failure to perform the associated public notification 10 point shall be assessed.

(iv) A system which fails to install source water treatment if the source waters exceed the lead or copper action level shall be assessed 35 points. For each failure to perform the associated public notification 10 points shall be assessed.

(v) A system which fails to complete public notification/education if the lead/copper action levels have been exceeded shall be assessed 10 points for each calendar quarter that the system fails to provide public notification/education.

(vi) A system which still exceeds the lead action level and is not on schedule for lead line replacement shall be assessed 5 points annually. For each failure to perform the associated public notification 2 point shall be assessed.

(l) Groundwater Turbidity:

(i) For each monitoring violation for turbidity 35 points shall be assessed. For each failure to perform the associated public notification 5 points shall be assessed.

(ii) For each confirmed MCL exceedance of turbidity 50 points shall be assessed. For each failure to perform the associated public notification 10 points shall be assessed.

(m) Surface Water Treatment:

(i) For water systems having sources which are classified as under direct influence from surface water and which fail to abandon, retrofit or provide conventional complete treatment or it's equivalent within 18 months of notification shall be assessed 150 points. For the associated failure to perform public notification 10 points shall be assessed. The points shall be assessed as the failure occurs and shall remain on record until adequate treatment is provided or the source is physically disconnected.

(ii) Quality and Monitoring: The surface water treatment assessments shall be updated on a monthly basis with the total number of points reflecting the most recent twelve month period.

(A) Turbidity:

(I) For each turbidity exceedance which requires tier 1 notification under R309-220-5(1)(e) or (f) 50 points shall be assessed. For the associated failure to perform public notification 10 points shall be assessed.

(II) For each turbidity exceedance which requires tier 2 notification under R309-220-5(1)(e) or (f) 35 points shall be assessed. For the associated failure to perform public notification 10 points shall be assessed.

(III) For each month where the percentage of turbidity interpretations meeting the treatment plant limit is less than 95 percent 25 points shall be assessed. For the associated failure to perform public notification 10 points shall be assessed.

(IV) For any period of time which exceeds 4 hours where the system fails to continuously measure (or perform grab samples) the combined filter effluent turbidity 50 points shall

be assessed. For the associated failure to perform public notification 10 points shall be assessed.

(V) For a water system which failure to repair continuous turbidity monitoring equipment within 5 working days 50 points shall be assessed.

(B) Disinfection:

(I) For each instance where the disinfectant level in water entering the distribution system is less than 0.2 milligrams per liter for more than 4 hours 25 points shall be assessed. For the associated failure to perform public notification 5 points shall be assessed.

(II) For each instance where there is insufficient disinfectant contact time 35 points shall be assessed. For the associated failure to perform public notification 5 points shall be assessed.

(iii) Treatment Process Control:

(A) For each instance a treatment facility exceeds the assigned filter rates 30 points shall be assessed.

(B) For each month a water system fails to verify calibration of the plant turbidimeters 5 points shall be assessed.

(C) For each month a water system fails to submit a water treatment plant report 50 points shall be assessed.

R309-400-6. Physical Facilities.

All points assessed to public water systems via this subsection are based upon violation of R309-500 through R309-705 unless otherwise noted. These points shall be assessed and updated upon notification of the Executive Secretary and shall remain until the violation or deficiency no longer exists.

(1) New Source Approval:

(a) Use of an unapproved source shall be assessed 150 points.

(2) Surface Water Diversion Structures and Impoundments:

(a) For each surface water intake structure that does not allow for withdrawal of water from more than one level if quality significantly varies with depth 2 points shall be assessed.

(b) Where no facilities exist for release (wasting) of less desirable water held in storage 2 points shall be assessed.

(c) Where the diversion facilities do not minimize frazil ice formation by holding intake velocities to less than 0.5 feet per second 2 points shall be assessed.

(d) Where diversion facilities are not adequately protected from damage by ice buildup 2 points shall be assessed.

(e) Where diversion facilities are not capable of keeping large quantities of fish or debris from entering the intake 2 points shall be assessed.

(f) Where reservoirs have not had brush and trees removed to the high water level 2 points shall be assessed.

(g) Where reservoir watershed management has not provided adequate precautions to limit nutrient loading 10 points shall be assessed.

(3) Well Sources

(a) For each well which is not equipped with a sanitary seal, or has any unsealed opening into the well casing 50 points shall be assessed.

(b) For each well which does not utilize food grade mineral oil for pump lubrication 25 points shall be assessed.

(c) For each well casing which does not terminate at least 12 inches above the pumphouse floor, 18 inches above ground, and/or five feet above the highest flood elevation and is subject to flooding 20 points shall be assessed.

(d) For each well fitted with a pitless adaptor that does not maintain a water tight seal throughout shall be assessed 50 points.

(e) For each wellhead that is not properly secured 20 points shall be assessed.

(f) For each well that is equipped with a pump to waste line that does not discharge though an approved air gap shall be assessed 20 points.

(g) For each well that is equipped with a pump to waste line that is not properly

screened shall be assessed 5 points.

(h) For each well that is equipped with a pump to waste line that discharges to a receptacle without local authorization shall be assessed 2 points.

(i) For each well that does not have a means to measure drawdown 1 point shall be assessed.

(j) For each well casing vent which is not properly covered with a No. 14 mesh screen 2 points shall be assessed.

(k) For each well casing vent which is not properly turned down 2 points shall be assessed.

(l) For each well casing vent which does not discharge through a proper air gap 2 points shall be assessed.

(m) For each well which has discharge piping that is not properly equipped with 1) a smooth nosed sampling tap 2) check valve 3) pressure gauge 4) means of measuring flow and 5) shutoff valve 1 point shall be assessed for each component not present.

(n) For each well where there is no means to release trapped air from the discharge piping 6 points shall be assessed.

(o) For each well house which does not have a drain-to-daylight installed 5 points shall be assessed.

(p) For each well which has a cross connection present in the discharge piping 5 points shall be assessed.

(q) For each well which has discharge piping equipped with an air vacuum relief valve which is not screened 2 points shall be assessed.

(r) For each well which has discharge piping equipped with an air vacuum relief valve which is not properly turned down 2 points shall be assessed.

(s) For each well which has discharge piping equipped with an air vacuum relief valve which does not discharge through an approved air gap 2 points shall be assessed.

(t) For each well which has rotating and electrical equipment that is not provided with protective guards 2 points shall be assessed.

(4) Spring Sources:

(a) For each spring source which allows surface water to stand or pond upon the spring collection area (within 50 feet from collection devices) 10 or 20 points shall be assessed. The number of points shall be based upon the size and extent of the ponding; the possible source (rainfall or incomplete collection); or the presence of moss or other indicators of long term presence of standing water.

(b) For each spring area which does not have a minimum of ten feet of relative impervious soil or an acceptable liner 10 points shall be assessed.

(c) For each spring area that has deep rooted vegetation within the fenced collection area 10 points shall be assessed.

(d) For each spring area that has deep rooted vegetation interfering with the spring collection 10 points shall be assessed.

(e) For each spring with a spring collection/junction box which does not have a proper shoebox lid shall be assessed 5 points.

(f) For each spring with a spring collection/junction box which does not have a proper gasket on the lid shall be assessed 5 points.

(g) For each spring with a spring collection/junction box which lacks an adequate air vent 5 points shall be assessed.

(h) For each spring with a spring collection/junction box with a vent that is not properly screened shall be assessed 2 points.

(i) For each spring with a spring collection/junction box with a vent that is not properly down turned shall be assessed 2 points.

(j) For each spring with a spring collection/junction box with a vent that is not properly air gapped shall be assessed 2 points.

(k) For each spring with a spring collection/junction box that lacks a raised access entry shall be assessed 5 points.

(l) For each spring with a spring collection/junction box which is not secured against unauthorized access shall be assessed 20 points.

(m) For each spring collection area without a proper fence (unless the spring is located in a remote area where no grazing or public access is possible as specified in R309-515-7(7)(e) 10 points shall be assessed.

(n) For each spring collection area that does not have a diversion channel capable of diverting surface water away from the collection area 5 points shall be assessed.

(o) For each spring system which does not have a permanent flow measuring device 5 points shall be assessed.

(p) For each spring area with an overflow/drain that is not properly screened with a No. 4 mesh screen 5 points shall be assessed.

(q) For each spring collection/junction box that does not have adequate freefall (12 to 24 inches) between the drain invert and the surrounding ground 5 points shall be assessed.

(r) For each spring collection/junction box that has any unsealed opening(s) 50 points shall be assessed.

(5) Pump Stations.

(a) For a pumping facility which does not have a positive-acting check valve between the pump and the isolation valve 1 point shall be assessed. R309-540-5(6)(a).

(b) For a pumping facility which does not have a standard pressure gauge on the discharge line 1 point shall be assessed. R309-540-5(6)(c)(i).

(c) For a pumping facility which does not have a flow measuring device on the discharge piping 1 point shall be assessed. R309-540-5(6)(c)(iii).

(d) For a pumping facility which does not have isolation valve(s) on the discharge piping 1 point shall be assessed. R309-540-5(6)(a).

(e) For a pumping facility which does not have isolation valve(s) on the suction side of each pump 1 point shall be assessed. R309-540-5(6)(a).

(f) For a pumping facility without adequate drainage 5 points shall be assessed. R309-540-5(2)(a) (v) and (vi).

(g) For a pumping facility where the discharge line from the air release valve is not properly screened with number 14 non-corrodible mesh screen 2 points shall be assessed. R309-550-6(6)(a).

(h) For a pumping facility where the discharge line from the air release valve is not properly air gapped 2 points shall be assessed. R309-550-6(6)(a).

(i) For a pumping facility where the discharge line from the air release valve is not properly down-turned 2 points shall be assessed. R309-550-6(6)(a).

(j) For a pumping facility where the building and equipment is not protected from

flooding 5 points shall be assessed. R309-540-5(2)(a)(ii), (iii) and (iv).

(k) For a pumping facility where there is inadequate heating, lighting or ventilation 5 points shall be assessed. R309-540-5(2)(e), (f) and (g).

(l) For a pumping facility where there are cross connections present 5 points shall be assessed. R309-540-5(2)(h).

(m) For a pumping facility which does not have at least two equal and functioning pumping units 20 points shall be assessed. R309-540-5(4)(b).

(n) For a pumping facility which cannot meet the demand when the largest pumping unit is out of service 20 points shall be assessed. R309-540-5(4)(b).

(o) For a pumping facility which utilizes oil lubrication not suitable for human consumption 25 points shall be assessed. R309-105-10(7).

(p) For a pumping facility which does not have protective guards on rotating and electrical equipment 2 points shall be assessed. R309-545-19(1).

(q) For a pumping facility which does not have an air release valve or other means to release trapped air located on the pump discharge piping 6 points shall be assessed. R309-515-6(12)(e)(v).

(r) For a pumping facility which is not secured against unauthorized access shall be assessed 20 points.

(6) Hydropneumatic pressure tanks.

(a) For a pressure tank without at least two pumping units 20 points shall be assessed. R309-540-6(5).

(b) For a pressure tank without a bypass piping to permit operation of the system while it is being repaired or painted 2 points shall be assessed. R309-540-6(4).

(c) For a pressure tank which lacks a 24 inch access manhole where applicable 1 point shall be assessed. R309-540-6(6).

(d) For a pressure tank which lacks a drain 1 point shall be assessed. R309-540-6(6).

(e) For a pressure tank which lacks a pressure gauge 1 point shall be assessed. R309-540-6(6).

(f) For a pressure tank which lacks a water sight glass where applicable 1 point shall be assessed. R309-540-6(6).

(g) For a pressure tank which lacks automatic or manual air blow-off 1 point shall be assessed. R309-540-6(6).

(h) For a pressure tank which lacks a means to add air 1 point shall be assessed. R309-540-6(6).

(i) For a pressure tank which lacks pressure operated start-stop controls for the pump(s) 1 point shall be assessed. R309-540-6(6).

(j) For a pressure tank with a pump cycle that cycles more frequently than once every 4 minutes 5 points shall be assessed. R309-540-6(5).

(k) For a pressure tank and controls that are not secured against unauthorized access 20 points shall be assessed. R309-545-14(3).

(7) Storage:

(a) A water system with an uncovered finished water storage reservoir shall immediately be assessed a rating of not approved.

(b) For each storage reservoir cover that is not sloped so water will drain 10 points shall be assessed.

(c) For each storage reservoir that does not have an access opening 9 points shall be assessed.

(d) For each storage reservoir access that does not have a shoebox type lid with a minimum of a 2 inch overlap 3 points shall be assessed.

(e) For each storage reservoir access that lacks a proper gasket 3 points shall be assessed.

(f) For each storage reservoir access that lacks a minimum rise of 4 inches above the tank roof (18 inches above an earthen cover) 3 points shall be assessed.

(g) For each storage reservoir that is not vented 6 points shall be assessed.

(h) For each storage reservoir vent that is not turned down or covered from rain and dust 2 points shall be assessed.

(i) For each storage reservoir vent that does not terminate a minimum of 24 to 36 inches above the surface of the storage tank roof 2 points shall be assessed.

(j) For each storage reservoir vent that is not screened with number 14 non-

corrodible mesh screen with a larger guage protection screen 2 points shall be assessed.

(k) For each storage reservoir that lacks a overflow 15 points shall be assessed.

(l) For each storage reservoir overflow that does not terminated 12 to 24 inches above the ground 5 points shall be assessed.

(m) For each storage reservoir overflow that is not screened with number 4 non-corrodible mesh screen 5 points shall be assessed.

(n) For each storage reservoir overflow that is connected to a sewer without an appropriate air gap 5 points shall be assessed.

(o) For each storage reservoir with a drain that is not properly screened 5 points shall be assessed.

(p) For each storage reservoir with a drain that does not discharge through a physical airgap of at least 2 pipe diameters 5 points shall be assessed.

(q) For each storage reservoir with inadequate or improper means of site drainage 5 points shall be assessed.

(r) For each storage reservoir with any unsealed roof penetrations 50 points shall be assessed.

(s) For each storage reservoir where the roof and sidewalls are not water tight shall be assessed 10 to 50 points based upon the size and number of cracks, the loss of structural integrity and the access of contamination to the drinking water.

(t) For each storage reservoir without an access ladder, ladder guards, balcony railings or safely located entrance hatches 2 points shall be assessed.

(u) For each storage reservoir with internal coatings not in compliance with ANSI/NSF standard 61 30 points shall be assessed.

(v) For a storage facility which is not secured against unauthorized access shall be assessed 20 points.

(8) Distribution System:

(a) A water system which fails to provide at least the water pressure as required in R309-105-9 at all times and at all locations within the distribution system shall be assessed 50 points.

(b) A water system using unapproved pipe and materials shall be assessed 30 points.

(c) A water system with pipelines installed improperly without adequate clearance or separation from sewer lines shall be assessed 30 points.

(d) A new water system constructed after January 1, 2007 or an existing water system modification without adequate pressure as defined in R309-105-9(2) shall be assessed 50 points.

(e) A water system which has a distribution line that crosses under a surface water body without adequate protection as outlined in R309-550-8(8)(b) shall be assessed 50 points.

(f) A water system which has distribution system flushing devices which are directly connected to a sewer or do not have a proper air gap shall be assessed 20 points.

(g) A water system that does not properly follow the AWWA disinfection standards as adopted in R309-105-10(2) and (3) shall be assessed 10 points.

(h) A water system that is required to provide fire protection or supplies fire hydrants with water mains that are less than 8 inched in diameter shall be assessed 5 points. These points will only be assessed for water mains installed after 1995.

(i) For each air vacuum release valve which is not properly screened and turned down 10 points shall be assessed.

(j) For each air vacuum release valve where the discharge piping does not extend a proper distance above the ground and flood level 10 points shall be assessed.

(k) For each air vacuum release valve chamber without a drain or adequate sump 30 points shall be assessed.

(l) For each air vacuum release valve chamber which shows evidence of flooding 30 points shall be assessed.

(m) For each air vacuum release valve chamber which is flooded at the time of inspection 50 points shall be assessed.

(9) Quantity requirements

(a) A water system which does not have sufficient source capacity to meet peak daily and average yearly flow requirements shall be assessed from 10 to 50 points. The number of points shall be based upon the severity of the shortage including the number of times and duration of water outages or low pressure.

(b) A water system which does not have sufficient storage capacity to meet average daily flow requirements shall be assessed from 10 to 50 points. The number of points shall be based upon the severity of the shortage including the number of times and duration of water outages.

R309-400-7. Treatment Processes.

(1) General Treatment.

(a) For a treatment facility with chemical feeders and pumps that operate at lower than 20 percent of the feed range 2 points shall be assessed. R309-525-11(7)(a)(viii).

(b) For a treatment facility without anti-siphon control to assure that liquid chemical solutions cannot be siphoned through solution feeders into the process units as required in R309-525-11(9)(c) 2 points shall be assessed. R309-525-11(9)(b)(ii).

(c) For a treatment facility with a process tank that is not properly labeled to designate the chemical contained 2 points shall be assessed. R309-525-11(8)(c)(vii).

(d) For a treatment facility with chemicals not stored in covered or unopened shipping containers, unless the chemical is transferred into a covered storage unit, 2 points shall be assessed. R309-525-11(6)(a)(iii).

(e) For a treatment facility with no cross connection control provided to assure that no direct connections exist between any sewer and the drain or overflow from the feeder, solution chamber or tank by providing that all pipes terminate at least six inches or two pipe diameters, whichever is greater, above the overflow rim of a receiving sump, conduit or waste receptacle, 2 points shall be assessed. R309-525-11(9)(b)(iii).

(f) For a treatment facility with no spare parts available for all feeders to replace parts which are subject to wear and damage 2 points shall be assessed. R309-525-11(7)(b)(v).

(g) For a treatment facility with chemical feed rates not proportional to flows 10 points shall be assessed. R309-525-11(7)(d)(ii).

(h) For a treatment facility with liquid chemical feeders without anti-siphon protection in each feed pump 2 points shall be assessed. R309-525-11(9)(c). Tg12

(i) For a treatment facility with feed lines not protected against freezing 2 points shall be assessed. R309-525-11(8)(d)(i)(C).

(j) For a treatment facility with feed lines not made of durable, corrosion resistant

material 2 points shall be assessed. R309-525-11(8)(d)(i)(A).

(k) For a treatment facility with any chemical not conducted from the feeder to the point of application in a separate conduit 2 points shall be assessed. R309-525-11(7)(a)(v).

(l) For a treatment facility where incompatible chemicals are fed, stored or handled together 2 points shall be assessed. R309-525-11(7)(a)(iv).

(m) For a treatment facility where daily operating records do not reflect chemical dosages and total quantities used 2 points shall be assessed. R309-105-14(2)(a).

(n) For a water system that fails to maintain and properly calibrate all instrumentation needed to verify the treatment process 2 points shall be assessed. R309-525-25(4).

(o) For a treatment facility without the means to accurately measure the quantities of chemicals used 2 points shall be assessed. R309-525-11(7)(a)(i).

(p) A water system that does not keep acids and caustics in closed corrosion-resistant shipping containers or storage units 2 points shall be assessed. R309-525-11(11)(a)(i).

(q) For a treatment facility that does not have the vent hose from the feeder to discharge to the outside atmosphere above grade or have the end covered with #14 non-corrodible mesh screen 2 points shall be assessed. R309-520-10(2)(f).

(r) For a treatment facility that uses any chemical that is added to water being treated for use in a public water system for human consumption that does not comply with ANSI/NSF Standard 60 25 points shall be assessed. R309-525-11(5).

(s) For a treatment facility that does not have a finished water sampling tap(s) 2 points shall be assessed. R309-525-18.

(t) For a treatment facility that is not performing adequate process control testing consistent with the specific treatment process 30 points shall be assessed. R309-525-19.

(u) For a surface water treatment facility that does not have continuous residual disinfection equipment to measure continuously measure the residual in mg/L entering the distribution system 20 points shall be assessed. R309-215-10(1).

(v) For a treatment facility without provisions for measuring quantities of chemical used to prepare feed solutions 50 points shall be assessed. R309-525-11(6)(b)(iii).

(w) For a treatment facility without provisions for disposing of empty bags, drums

or barrels by an acceptable procedure which will minimize operator exposure to dusts 2 points shall be assessed. R309-525-11(6)(b)(ii).

(x) For a treatment facility which does not provide cross connection control on the make-up waterlines discharging to solution tanks 5 points shall be assessed. R309-525-11(9)(c)(i).

(y) For a treatment facility with overflow pipes that do not have a free fall discharge or are not located where noticeable, 2 points shall be assessed. R309-525-11(8)(b)(v)(A).

(z) For a treatment facility with subsurface locations for solution tanks that are not free from sources of possible contamination 2 points shall be assessed. R309-525-11(8)(b)(iv)(A).

(z1) For a treatment facility with subsurface locations for solution tanks that do not assure positive drainage for ground waters, accumulated water, chemical spills and overflows 2 points shall be assessed. R309-525-11(8)(b)(iv)(B).

(z2) For a treatment facility with a motor driven transfer pump that is not provided a liquid level limit switch and an overflow from the day tank, which will drain by gravity back into the bulk storage tank 10 points shall be assessed. R309-525-11(8)(c)(v).

(z3) For a treatment facility without adequate spill containment provisions 2 points shall be assessed. R309-525-11(6)(a)(iv)(B)(v).

(z4) For a treatment facility with acid storage tanks that are not vented to the outside atmosphere with separate screened vents 2 points shall be assessed. R309-525-11(8)(b)(vi).

(z5) For a treatment facility without a means to measure the solution level in the tank 2 points shall be assessed. R309-525-11(8)(b)(ii).

(z6) For a treatment facility without provisions for the proper disposal of water treatment plant waste (such as sanitary, laboratory, sludge, and filter backwash water) 5 points shall be assessed. R309-525-23.

(z7) For a treatment facility that does not use of either a volumetric or gravimetric chemical feeder for dry chemicals 2 points shall be assessed. R309-525-11(7)(c)(i).

(z8) For a disinfection facility where cross connection control is not provided on the feed lines to the solution tanks 10 points shall be assessed. R309-520-10(1)(h).

(z9) For a treatment facility that does not have a means to measure water flow rate 10 points shall be assessed.

(z10) For a treatment facility where feed lines are not labeled and color coded for identification 2 points shall be assessed. R309-525-8.

(z11) For a treatment facility which is not secured against unauthorized access shall be assessed 20 points.

(2) Disinfection.

(a) For a disinfection facility without an automatic switch over of chlorine cylinders to assure continuous disinfection 2 points shall be assessed. R309-520-10(2)(a).

(b) For a disinfection facility without scales for weighing cylinders 2 points shall be assessed. R309-520-10(2)(k).

(c) For a disinfection facility without a leak repair kit for 1 ton cylinders 15 points shall be assessed. R309-520-10(2)(p).

(d) For a disinfection facility without respiratory equipment available and stored at a convenient location 5 points shall be assessed. R309-520-10(2)(o).

(e) For a disinfection facility where the chlorine gas feed and storage area is not enclosed and separated from other operating areas 2 points shall be assessed. R309-520-10(2)(i).

(f) For a disinfection facility which is not heated, lighted or ventilated as necessary to assure proper operation or the equipment and serviceability 2 points shall be assessed. R309-520-10(1)(l).

(g) For a disinfection facility where the chlorination equipment rooms are not vented such that the ventilating fan(s) take suction near the floor, as far as practical from the door and air inlet, with the point of discharge so located as not to contaminate air inlets of any rooms or structures 5 points shall be assessed. R309-520-10(2)(e) (ii).

(h) For a disinfection facility where the chlorination equipment rooms are not vented such that air inlets are through louvers near the ceiling 2 points shall be assessed. R309-520-10(2)(e) (iii).

(i) For a disinfection facility where the chlorination equipment rooms are not vented such that louvers for chlorine room air intake and exhaust facilitate airtight closure 2 points shall be assessed. R309-520-10(2)(e) (iv).

(j) For a disinfection facility where the chlorination equipment rooms are not vented such that separate switches for the fans and lights are outside of the room, at the entrance to the chlorination equipment room and protected from vandalism 2 points

shall be assessed. R309-520-10(2)(e) (iv).

(k) For a disinfection facility where the vent hose from the feeder to discharge to the outside atmosphere is not above grade or does not have the end covered with #14 non-corrodible mesh screen 2 points shall be assessed. R309-520-10(2)(f).

(l) For a disinfection facility without a bottle of ammonium hydroxide (56%) shall be available for leak detection 2 points shall be assessed. R309-520-10(2)(p).

(m) For a disinfection facility without full and empty cylinders of chlorine gas restrained in position to prevent upset 2 points shall be assessed. R309-520-10(2)(i).

(n) For a disinfection facility with full and empty cylinders of chlorine gas stored in rooms not separated from ammonia storage 2 points shall be assessed. R309-520-10(2)(i).

(o) For a disinfection facility with full and empty cylinders of chlorine gas stored in areas in direct sunlight or exposed to excessive heat 2 points shall be assessed. R309-520-10(2)(i).

(p) For a disinfection facility where the chlorine room is constructed in a manner that any openings between the chlorine room and the remainder of the plant are not sealed 2 points shall be assessed. R309-520-10(2)(h)(ii).

(q) For a disinfection facility utilizing 1 ton cylinders without a means of leak detection available 15 points shall be assessed. R309-520-10(2)(p).

(r) For a disinfection facility without pressure gauges on the inlet and outlets of each chlorine injector 2 points shall be assessed. R309-520-10(2)(b).

(s) For a disinfection facility without cross connection control on the solution feeders into the process units as required in R309-525-11(9)(c) 5 points shall assessed. R309-525-11(9)(b)(ii).

(t) For a disinfection facility where there is no standby disinfection equipment of sufficient capacity available to replace the largest unit 10 points shall be assessed. R309-520-10(1)(k).

(u) For a disinfection facility where a leak detector is provided and not equipped with both an audible alarm and a warning light 5 points shall be assessed. R309-520-10(2)(p).

(v) For a disinfection facility where the correct reagent is not used for testing free disinfectant residual 2 points shall be assessed. R309-520-15(3).

(w) For a disinfection facility where hypochlorite liquid feeders are not a positive

displacement type 10 points shall be assessed. R309-520-10(1)(b).

(x) For a treatment facility where the pre- and post-chlorination systems are not independent to prevent possible siphoning of partially treated water into the clear well 50 points shall be assessed. R309-525-11(9)(b)(iv).

(y) For a disinfection facility where each tank is not provided with a valved drain or protected against backflow in accordance with R309-11(10)(b) and (c) 2 points shall be assessed. R309-525-11(8)(b)(vii).

(z) For a disinfection facility where overflow pipes are not located where they can be readily monitored 2 points shall be assessed. R309-520-10(1)(g).

(z1) For a disinfection facility where storage and day tanks are not provided with separate vents that terminate to the outside atmosphere 2 points shall be assessed. R309-525-11(8)(b)(vi).

(z2) For a disinfection facility where a means consistent with the nature of the chemical solution is not provided in a day tank to maintain a uniform strength of solution 2 points shall be assessed. R309-525-11(d)(8)(c)(iv).

(z3) For a disinfection facility where any chemical is not conducted from the feeder to the point of application in separate conduit 2 points shall be assessed. R309-525-11(7)(a)(v).

(z4) For a disinfection facility where chemical solution tanks are not kept covered 2 points shall be assessed. R309-525-11(8)(b)(iii).

(z5) For a disinfection facility without disinfectant residual test equipment 2 points shall be assessed. R309-520-10(1)(j).

(z6) For a disinfection facility where there is no means to measure the volume of water treated 2 points shall be assessed. R309-520-10(1)(i).

(z7) For a disinfection facility where provisions are not made for proper storage of sodium chlorite to eliminate any danger of explosion 2 points shall be assessed. R309-525-11(11) (b)(i).

(z8) For a disinfection facility where sodium chlorite is not stored by itself in a separate room and away from organic materials which would react violently with sodium chlorite 2 points shall be assessed. R309-525-11(11) (b)(i)(A).

(z9) For a disinfection facility where sodium chlorite storage structures are not constructed of noncombustible materials 2 points shall be assessed. R309-525-11(11)(a)(b)(i)(B).

(z10) For a disinfection facility where sodium chlorite storage structure is not located in an area where a fire may occur, water should be available to keep the sodium chlorite area sufficiently cool to prevent decomposition from heat and resultant potential explosive conditions 2 points shall be assessed. R309-525-11(11)(b)(i)(C).

(3) Fluoridation.

(a) For a fluoridation facility that does not calculate fluoride concentrations, including chemical dosages and total water quantities, daily 2 points shall be assessed. R309-105-14(2)(a).

(b) For a fluoridation facility where there is not a fail-safe device incorporated in the fluoride feed control system to prevent overfeeding fluoride 30 points shall be assessed. R309-535-5(3).

(c) For a fluoridation facility that uses sodium fluoride, sodium silicofluoride and fluoriosilicic acid that does not conform to the applicable AWWA standards or with ANSI/NSF Standard 60 25 points shall be assessed. R309-535-5.

(d) For a fluoridation facility where liquid chemical storage tanks are not equipped with an inverted "J" air vent 2 points shall be assessed. R309-525-11(6)(a)(iv)(c).

(e) For a fluoridation facility where the make-up water is not properly treated for hardness 2 points shall be assessed. R309-535-5(2)(i).

(f) For a fluoridation facility with no provisions for the proper disposal of water treatment plant waste (such as sanitary, laboratory, sludge, and filter backwash water) 5 points shall be assessed. R309-525-23.

(g) For a fluoridation facility without a spring opposed diaphragm type anti-siphon device shall be provided for all fluoride feed lines and dilution water lines 10 points shall be assessed. R309-535-5(2)(f).

(h) For a fluoridation facility with saturators that do not have a flowmeter on the inlet or outlet line 2 points shall be assessed. R309-535-5(2)(l).

(i) For a fluoridation facility without an adequate level of fluoride crystals in the saturator 2 points shall be assessed. R309-525-11(d)(8)(b)(i).

(j) For a fluoridation facility without NIOSH/MSHA certified dust respirator approved for fluoride dust removal as required in R309-525-11(10) for operators handling fluoride compounds 2 points shall be assessed. R309-535-5(4).

(k) For a fluoridation facility without scales, loss-of-weight recorders or liquid level

indicators, as appropriate, 2 points shall be assessed. R309-535-5(2)(a).

(l) For a fluoridation facility without deluge showers and eye wash devices 2 points shall be assessed. R309-535-5(4).

(m) For a fluoridation facility without proper personal protective equipment as required in R309-525-11(10) for operators handling fluoride compounds 2 points shall be assessed. R309-535-5(4).

(n) For a fluoridation facility where an overflow from the day tank will not drain by gravity back into the bulk storage tank or a containment system 10 points shall be assessed. R309-525-11(8)(c)(v).

(o) For a fluoridation facility where the saturators are not of the up-flow type 2 points shall be assessed. R309-535-5(2)(l).

(4) Activated Carbon.

(a) For a treatment facility that does not periodically check media depth against design standards 10 points shall be assessed. R309-525-19.

(b) For a treatment facility that does not have a standard operating practice for the backwash procedure 10 points shall be assessed. R309-525-19.

(c) For a treatment facility that does not provide cross connection control for the in-plant water supply 2 points shall be assessed. R309-525-11(9)(b).

(d) For a treatment facility where the output of any chemical pump is inadequate to supply the required dose rate 2 points shall be assessed. R309-525-11(7)(a)(i).

(e) For a treatment facility where the in plant water supply is inadequate in pressure and quantity 2 points shall be assessed. R309-525-11(9)(a).

(f) For a treatment facility where the vents from feeders, storage facilities and equipment exhaust does not discharge to the outside atmosphere above grade and does not have the end covered with #14 non-corrodible mesh screen 2 points shall be assessed. R309-520-10(2)(f).

(5) Filtration Treatment.

(a) For a filtration facility that does not have equipment for each individual filter to continuously monitor the effluent turbidity 30 points shall be assessed.

(b) For a filtration facility that does not provide a minimum backwash rate of 15

gpm/sf for conventional filters 50 points shall be assessed.

(c) For a filtration facility that does not have the ability to filter to waste (to allow a filter to ripen before introduction finished water into the clearwell) 50 points shall be assessed.

R309-400-8. Operator Certification.

(1) A water system that is required to have a certified operator and does not shall be assessed 30 points.

(2) A water system where the operator is not certified at the appropriate level shall be assessed 10 points.

(3) A grade 3 or 4 water system that does not have all direct responsible charge operators (as specified in R309-300-5(5)) certified at the level of the system shall be assessed 5 to 15 points. The number of points shall be based on the percentage of time that the water system is operated by operators not certified at the required level.

(4) A water system where the certified operator does not live within a one hour response time shall be assessed 20 points.

(5) A water system may be credited up to a maximum of 20 points which shall remain on record for as long as the conditions apply. The following items are eligible for credit:

(a) A water system that is not required to have a certified operator and does shall be credited 10 points.

(b) A water system that has operators that are certified at a higher level than required shall be credited 10 points.

(c) A water system that has operators certified in other areas that are not required by that water system, such as treatment or backflow prevention certification, shall be credited 10 points.

R309-400-9. Cross Connection Control Program.

(1) A water system which does not have any of the below listed components of a cross connection control program in place shall be assessed 50 points.

(2) A water system which only has some of the components of a cross connection control program in place shall be assessed the following number of points:

(a) A water system which does not have local authority to enforce a cross

connection control program (i.e., ordinance, bylaw or policy) shall be assessed 10 points.

(b) A water system that does not provided public education or awareness material or presentations on an annual basis shall be assessed 10 points.

(c) A water system that does not have an operator with training in the area of cross connection control or backflow prevention shall be assessed 10 points.

(d) A water system with no written records of cross connection control activities, such as, backflow assembly inventory and test history, shall be assessed 10 points.

(e) A water system that does not have on-going enforcement activities (hazard assessments and enforcement actions) shall be assessed 10 points.

R309-400-10. Drinking Water Source Protection.

Drinking water source protection (for ground water and surface water sources): Points shall be assessed for each source after a system fails to complete source protection plans as specified in R309-600 and R309-605. The points shall remain until such time as the violation or deficiency no longer exists.

(1) For a water system which has not appointed a designated person for source protection and notified the Division 5 points shall be assessed.

(2) For a water system which does not maintain a current copy of their source protection plan(s) or source assessment(s) on the water system premises 30 points shall be assessed.

(3) For a water system which does not maintain a current inventory of potential contamination sources or susceptibility analysis and determination 10 points shall be assessed.

(4) For a water system which does not maintain current records of land management strategies (such as, ordinances, codes, permits, public education programs, meeting minutes) 10 points shall be assessed.

(5) For a water system with any new sources for which a Preliminary Evaluation Report has not been submitted 150 points shall be assessed. These points shall be included with the points for an unapproved source, not in addition to.

(6) For a water system which has any old sources that have come into use for which a source protection plan has not been submitted 30 points shall be assessed.

(7) For a water system which has reconstructed or redeveloped a water source and has not submitted a revised source protection plan 20 points shall be assessed.

R309-400-11. Administrative Issues.

Points in this area shall be assessed at the time that the failure occurs or upon notification of the Executive Secretary and shall remain until the issue is resolved unless otherwise specified.

(1) Administrative Data -

(a) A water system which has not designated a person or organizational official responsible for the system including a current address and phone number shall be assessed 10 points.

(b) A water system project constructed without proper plan approval shall be assessed 1 to 50 points based on an evaluation of the project which shall include the structural or engineering integrity of the project; whether the plans and specifications were prepared and stamped by a licensed professional engineer; the adequacy of the materials used and the impact on the operation of the water system (good or bad). The points assessed shall remain on record for a period of one year.

(2) A water system with a current written Emergency Response Program

shall be credited 10 points that shall remain on record as long as the Program remains current.

(3) A water system with a written Financial Management Plan

including an appropriate rate structure, infra-structure replacement fund, and master plan shall be credited 10 points that shall remain on record as long as the Plan is current.

(4) Sampling Site Plans:

(a) A water system which does not have an adequate bacteriological sampling site plan shall be assessed 5 points.

(b) A water system which does not have a lead/copper sampling site plan shall be assessed 10 points.

(5) Customer Complaint:

(a) 1 to 100 points may be assessed for valid and documented customer complaints. The customer complaints include but are not limited to the following:

(i) Turbidity;

(ii) Pressure;

(iii) Taste and Odor;

(iv) Sickness (water suspected); and

(v) Waterborne Disease Outbreak (R309-104-9).

(vi) Periods of Water Outage

(b) The number of points shall be based upon the extent and documentation of the problem and the potential impact to public health. The documentation shall consist of an investigation by Department of Environmental Quality, Department of Health or Local Health Department personnel and may include an epidemiological study linking the drinking water to reported outbreaks of illness where appropriate.

(c) In the case of a documented waterborne disease outbreak the water system shall automatically be rated Not Approved for at least the duration of the threat to the quality of the drinking water and as long as it takes the water system to correct any deficiency that caused the outbreak.

(d) Points shall only be assessed once per issue and shall not be additive based on the number of calls per issue. These points shall be assessed and updated upon verification of the complaint by the Executive Secretary and shall remain on record until the issue or deficiency no longer exists. Points may have already been assessed in other areas as appropriate.

(6) Agency Directives –

When a directive consistent with the authority of the Drinking Water Board is not complied with 1 to 100 points may be assessed to a water system. Agency directives include but are not limited to the following:

(a) Administrative Orders;

(b) Rule defined action;

(c) Rule defined compliance schedule;

(d) Variance/Exemption requirements; and

(e) Bilateral Compliance Agreement.

Points shall be assessed based upon the severity of the non-compliance, the threat to public health and the underlying basis for the original directive.

(7) Data Falsification –

The Executive Secretary may assess a water system points for data falsification. The water system may be assessed 1 to 50 points for each occurrence based upon:

(a) the severity of the falsification;

(b) the threat to public health;

(c) the intent of the water system personnel; and

(d) the type of falsification.

(i) Reports only good data

(ii) Doctored results from the laboratory

(iii) Non-valid sample

Data reported to the Executive Secretary includes but is not limited to Water Treatment Plant Reports, Disinfection Reports, bacteriological and chemical analyses, and Annual Reports.

(8) Water Hauling:

(a) For a community water system that is hauling water as a permanent method of culinary water distribution 150 points shall be assessed.

(b) For a non-community system that is hauling water as a permanent method of culinary water distribution when there is alternate means of supplying quality drinking water 150 points shall be assessed.

(c) For a water system which has been granted an exception to haul water, if any part of the water hauling guidelines are not followed 50 points shall be assessed.

R309-400-12. Reporting and Record Maintenance Issues.

Points may be assessed for failure to provide required reports to the Executive Secretary by the reporting deadline. The points shall be assigned as the failure occurs and shall remain on record for a period of one year.

(1) Monthly Reports:

(a) For each failure to report the monthly water treatment plant report 10 points shall be assessed.

(2) Quarterly Repots:

(a) For each failure to report the quarterly disinfection report 10 points shall be assessed.

(3) Annual Reports:

(a) For failure to provide the annual report 2 points shall be assessed.

(b) For a community water system that fails to prepare or distribute a consumer confidence report as required in R309-225 2 points shall be assessed.

KEY: drinking water, environmental protection, water system rating, administrative procedures
Date of Enactment or Last Substantive Amendment: March 6, 2007
Notice of Continuation: May 16, 2005
Authorizing, and Implemented or Interpreted Law: 19-4-104; 63-46b-4

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R309-405. Compliance and Enforcement: Administrative Penalty.

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R309-405. Compliance and Enforcement: Administrative Penalty.

R309-405-1. Authority.

Utah Code Annotated, Sections 19-4-104 and 19-4-109

R309-405-2. Purpose, Scope, and Applicability.

(1) This rule sets the criteria and procedures the Board will use in assessing penalties to public drinking water systems for violation of its rules.

(2) This guidance and ensuing criteria is intended to be flexible and liberally construed to achieve a fair, just, and equitable result with the intent of returning a public water system to compliance.

(3) This rule is applicable to all public drinking water systems.

R309-405-3. Limits on Authority and Liability.

Nothing in this rule should be construed to limit the Board's ability to take enforcement actions under Utah Code Annotated, Section 19-4-109.

R309-405-4. Assessment of a Penalty and Calculation of Settlement Amounts.

(1) Where the Executive Secretary determines that a penalty may be appropriate, the Executive Secretary shall propose a penalty amount by sending a notice of agency action, under Title 63, chapter 46b of the Administrative Procedures Act, to the public water system. The notice of agency action shall provide that the public water system may submit comments and/or information on the proposed penalty to the Executive Secretary within 30 days. The criteria the Executive Secretary will use in establishing a proposed penalty amount shall be as follows:

(a) Major Violations: $600 to $1000 per day for each day of violation. This category includes violations with high potential for impact on drinking water users, major deviations from the requirements of the rules or Safe Drinking Water Act, intentional fraud, falsification of data, violations which result in a public water system being considered by the Environmental Protection Agency to be: "Significant Non-Compliers" (SNC), or violations that may have a substantial

adverse effect on the regulatory program. Specific violations that are subject to a major violation category can include the following:

(i) Violations subject to $1000 per day penalty:

(A) Any violation defined by R309-220-5 which would trigger a Tier 1 public notification.

(B) Not having any elements of a source protection plan as required in R309-600 for ground water sources and R309-605 for surface water sources.

(C) Failure to respond to an Administrative Order issued by the Drinking Water Board.

(D) Introduction by the water system of a source water that has not been evaluated and approved for use as a public drinking water source under R309-515.

(E) Construction or use of an interconnection to another public water system which has not been reviewed and approved in accordance with R309-550-9.

(F) Having over 20 IPS points (Improvement Priority System points based on R309-150, the Water System Rating Criteria) specifically for operating pressures below that required by R309-105-9.

(G) Having 50 IPS points specifically for an inadequate well seal as required in R309-515.

(H) Having over 50 IPS points (not including the deficiencies in (F) and (G) above) specifically assessed in the physical facility section of an IPS report.

(I) Use of a surface water source without proper filtration treatment in accordance with R309-525 or 530.

(J) Exceeding the rated water treatment plant capacity as determined by review under R309-525 or 530.

(K) Insufficient disinfection contact time as evaluated under R309-215-7.

(ii) Violations subject to $800 per day penalty:

(A) Not having any of the required components of a cross connection control program in place as required by R309-105-12.

(B) Any violation of the turbidity requirements outlined in R309-215-9(4)(b)(iii -iv) for individual filter turbidities using consecutive readings taken 15 minutes apart.

(b) Moderate Violations: $400 to $600 per day for each day of violation. This category includes violations with a moderate potential for impact on drinking water users, moderate deviations from the requirements of the rules or Safe Drinking Water Act with some requirements implemented as intended, or violations that may have a significant notable adverse effect on the regulatory program. Specific violations that are subject to a moderate violation category can include the following:

(i) Violations subject to $600 penalty:

(A) Any violation defined by R309-220-6 which would trigger a Tier 2 public notification.

(B) Having a disapproved status on a source protection plan (R309-600 and 605) for a period longer than 90 days.

(C) Installation or use of disinfection equipment that has not been evaluated and approved for use under R309-520.

(D) Having measured turbidity spikes of greater than 0.5 or 1.0 NTU in two consecutive fifteen minute readings as defined in R309-215-9(4)(b)(i) or (ii) respectively.

(E) Insufficient source capacity, storage capacity, or delivery capacity as established by review of the system design under R309-500 through 550.

(F) Not complying with plan approval requirements as set forth in R309-500. The term infrastructure can include the disinfection process, surface water treatment process, and physical facilities such as water treatment plants, storage reservoirs, sources and distribution piping.

(c) Minor Violations: Up to $400 per day for each day of violation. This category includes violations with a minor potential for impact on drinking water users, slight deviations from the rules or Act with most of the requirements implemented, or violations that may have a minor adverse effect on the regulatory program. Specific violations that are subject to a minor violation category can include the following:

(i) Violations subject to $400 per day penalty:

(A) Any violation defined by R309-220-7 which would trigger a Tier 3 public notification or a violation of the monitoring requirements of R309-515-4(5), except for turbidity monitoring for surface water treatment facilities and violations termed as minor monitoring as outlined in R309-150-3 (minor bacteriological routine monitoring violation, minor bacteriological repeat monitoring violation and minor chemical monitoring violation).

(B) Failure to upgrade a Preliminary Evaluation Report for a source protection plan as required in R309-600 and 605.

(C) Failure to update a source protection plan as required in R309-600 and 605.

(D) Construction or use of a storage reservoir that has not been evaluated for use under R309-545.

(ii) Violations subject to $200 per day penalty:

(A) Lacking individual components of a cross connection control program as required by R309-105-12.

(B) Not having a certified operator on staff as required in R309-300-5(10) after 1 year or 4 operator certification exam cycles.

(C) Any minor monitoring violation as defined by R309-150-3 (minor bacteriological routine monitoring violation, minor bacteriological repeat monitoring violation and minor chemical monitoring violation).

(D) Any violation of the turbidity requirements outlined in R309-215-9(4)(b)(i-ii) for individual filter turbidities using consecutive readings taken 15 minutes apart.

(2) The Executive Secretary will assess the penalty, if any, after reviewing information submitted by the public water system. The public water system may appeal the assessment of the penalty to the Board by requesting a formal hearing under R305-6 and the Utah Administrative Procedures Act within 30 days of the date of assessment of the penalty.

R309-405-5. Factors for Seeking or Negotiating Amount of Penalties.

The Executive Secretary, in assessing the penalty, may take into account the following factors:

(1) Economic benefit. The costs a person or organization may save by delaying or avoiding compliance with applicable laws or rules.

(2) Gravity of the violation. This component of the calculation shall be based on:

(a) The extent of deviation from the rules;

(b) The potential for harm to drinking water users, regardless of the extent of harm that actually occurred;

(c) The degree of cooperation or noncooperation and good faith efforts to comply. Good faith takes into account the openness in dealing with the violations, promptness in correction of problems, and the degree of cooperation with the State;

(d) History of compliance or noncompliance. The penalty amount may be adjusted upward in consideration of previous violations and the degree of recidivism. Likewise, the penalty amount may be adjusted downward when it is shown that the violator has a good compliance record; and,

(e) Degree of willfulness or negligence. Factors to be considered include how much control the violator had over the violation and the foreseeability of the events constituting the violation, whether the violator made or could have made reasonable efforts to prevent the violation, whether the violator knew, or should have known, of the legal requirements which were violated, and degree of recalcitrance.

(3) The number of days of non compliance

(4) Public sensitivity. The actual impact of the violation(s) that occurred.

(5) Response and investigation costs incurred by the State and others.

(6) The possible deterrent effect of a penalty to prevent future violations.

R309-405-6. Satisfaction of Penalty Under Stipulated Penalty Agreement.

The Executive Secretary may accept the following methods of payment or satisfaction of a penalty to promote compliance and to achieve the purposes set forth in Utah Code Annotated Section 19-4-109:

(1) Payment of the penalty may be extended based on a person or organization's inability to pay. This should be distinguished from an unwillingness to pay. In cases of financial hardship, the Executive Secretary may accept payment of the penalty under an installment plan or delayed payment schedule with interest.

(2) In circumstances where there is a demonstrated financial hardship, the Executive Secretary may allow a portion of the penalty to be deferred and eventually waived if no further violations are committed within a period designated by the Executive Secretary.

(3) In some cases, the Executive Secretary may allow the violator to satisfy the penalty by completing a Supplemental Environmental Project (SEP) approved by the Executive Secretary. The following criteria shall be used in determining the eligibility of such projects:

(a) The project must be in addition to all regulatory compliance obligations;

(b) The project must relate to some or all of the issues of the violation;

(c) The project must primarily benefit the drinking water users;

(d) The project must be defined, measurable and have a beginning and ending date;

(e) The project must be agreed to in writing between the public water system and the Executive Secretary;

(f) The project must not generate the public perception favoring violations of the laws and rules.

R309-405-7. Penalty Policy for Civil Proceedings.

Pursuant to Utah Code Annotated Section 19-4-109(2)(b), any person who willfully violates any rule or order made or issued pursuant to the Utah Safe Drinking Water Act, Utah Code Annotated Section 19-4-101 et seq, is subject to a civil penalty of not more than $5000 per day for each day of violation. The Board and Executive Secretary shall apply the provisions of R309-405-4, 5, and 6 in pursuing or resolving willful violations except that the penalty range per day for each day of violation for major violations shall be $3000 to $5000, for moderate violations shall be $2000 to $3000, and for minor violations shall be up to $2000.

KEY: drinking water, environmental protection, administrative procedures, penalties
Date of Enactment or Last Substantive Amendment: March 8, 2006
Notice of Continuation: March 22, 2010
Authorizing, and Implemented or Interpreted Law: 19-4-104; 63G-4-202

R309-500. Plan Review, Operation and Maintenance Requirements

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R309-500. Facility Design and Operation: Plan Review, Operation and Maintenance Requirements.

R309-500-1. Purpose.

The purpose of this rule is to describe plan review procedures and requirements, clarify projects requiring review, and inspection requirements for drinking water projects. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-500-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-500-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-500-4. General.

(1) Construction and Operation of New Facilities.

As authorized in 19-4-106(3) of the Utah Code, the Director may review plans, specifications, and other data pertinent to proposed or expanded water supply systems to insure proper design and construction.

Plans and specifications and a business plan as required by R309-800-5, along with a completed project notification form, shall be submitted to the Director for any new water systems or previously un-reviewed water systems unless acceptable data can be presented that the proposed or existing water system will not become a "public water system" as defined in 19-4-102 of the Utah Code or in R309-110.

Construction of new facilities for public water systems or existing facilities of previously un-reviewed public drinking water systems shall conform to rules R309-500 through R309-550; the "Facility Design and Operation" rules. There may be times in which the requirements of the Facility Design and Operation rules are not appropriate. Thus, the Director may grant an "exception" to the Facility Design and Operation rules if it can be shown that the granting of such an exception will not jeopardize the public health.

Construction of a public drinking water project shall not begin until complete plans and specifications have been approved in writing by the Director unless waivers have been issued as allowed by R309-500-6(3). This approval shall be referred to as the Plan Approval.

Furthermore, no new public drinking water facility shall be put into operation until written approval to do so has been given by the Director or this requirement waived. This approval is referred to as the Operating Permit.

(2) Existing Facilities.

All existing public drinking water systems shall be capable of reliably delivering water which meets the minimum current standard of drinking water quantity and quality requirements. The Director may require modification of existing systems in accordance with R309-500 through R309-550 when such modifications are needed to reliably achieve minimum quantity and quality requirements.

Guidance: Existing public drinking water facilities shall be upgraded to meet all current design and operation standards. Furthermore, R309-150, the Water System Rating Criteria, compels existing systems to correct deficiencies or risk a "Not Approved" rating. Thus, operators of existing systems are encouraged to continually evaluate their facilities with respect to current design and operation standards.

(3) Operation and Maintenance of Existing Facilities.

Public drinking water system facilities shall be operated and maintained in a manner which protects the public health. As a minimum, the operation and maintenance procedures of R309-500 through R309-550 shall be adhered to.

Guidance: In accordance with R309-104-2, certain water systems; which consist only of distribution and storage facilities (no collection or treatment) ; obtains all of it's water from another public water system which is required to monitor; does not sell water; and is not a carrier which conveys passengers in interstate commerce, may be exempted from monitoring requirements of R309-104. Such exemption does not extend to submittal of plans and specifications for any modifications considered a public drinking water project as outlined below. Additionally, if the system serves sufficient connections or individuals to be considered a "public water system", its management

must keep current those names, addresses and phone numbers required by R309-101-1.2.

R309-500-5. Public Drinking Water Project

(1) Definition.

A public drinking water project, requiring the submittal of a project notification form along with plans and specifications, is any of the following:

(a) The construction of any facility for a proposed drinking water system (see 19-4-106(3) of the Utah Code or R309-500-4(1) above describing the authority of the Director).

(b) Any addition to, or modification of, the facilities of an existing public drinking water system which may affect the quality or quantity of water delivered.

(c) Any activity, other than on-going operation and maintenance procedures, which may affect the quality or quantity of water delivered by an existing public drinking water system. Such activities include:

(i) the interior re-coating or re-lining of any raw or drinking water storage tank, or water storage chamber within any treatment facility,

(ii) the "in-situ" re-lining of any pipeline,

(iii) a change or addition of any primary coagulant water treatment chemical (excluding filter, flocculent or coagulant aids) when the proposed chemical does not appear on a list of chemicals pre-approved by the Director for a specific treatment facility, and

Guidance: The Division of Drinking Water will maintain a list of primary coagulant treatment chemicals which are "pre-approved" for use at a given plant. Plant operators will be required to only use primary coagulant chemicals from this list. When a different primary coagulant chemical is desired for use, this chemical must be reviewed by the Director and may be added to the "pre-approved" list for a given plant.

(iv) the re-development of any spring or well source or replacement of a well pump with one of different capacity.

(2) On-going Operation and Maintenance Procedures.

On-going operation and maintenance procedures are not considered public drinking water projects and, accordingly, are not subject to the project notification, plan approval and operating permit requirements of this rule. However, these activities shall be carried out in accordance with all operation and maintenance requirements contained in R309-500 through R309-550 and specifically the disinfection, flushing and bacteriological sampling and testing requirements of ANSI/AWWA C651-05 for pipelines, ANSI/AWWA C652-02 for storage facilities, and ANSI/AWWA C654-03 for wells before they are placed back into service. The following activities are considered to be on-going operation and maintenance procedures:

(a) pipeline leak repair,

(b) replacement of existing deteriorated pipeline where the new pipeline segment is the same size as the old pipeline or the new segment is upgraded to meet the minimum pipeline sizes required by R309-550-5(4) or larger sizes as determined by a hydraulic analysis in accordance with R309-550-5(3),

(c) tapping existing water mains with corporation stops so as to make connection to new service laterals to individual structures,

(d) distribution pipeline additions where the pipeline size is the same as the main supplying the addition or the pipeline addition meets the minimum pipeline sizes required by R309-550-5(4) or larger sizes as determined by a hydraulic analysis in accordance with R309-550-5(3), the length is less than 500 feet and contiguous segments of new pipe total less than 1000 feet in any fiscal year,

(e) entry into a drinking water storage facility for the purposes of inspection, cleaning and maintenance, and

(f) replacement of equipment or pipeline appurtenances with the same type, size and rated capacity (fire hydrants, valves, pressure regulators, meters, service laterals, chemical feeders and booster pumps including deep well pumps).

R309-500-6. Plan Approval Procedure.

Guidance:

Submittal of plans and specifications for drinking water projects are required of owners, operators, and managers of public water systems (pws).

Many times the Division receives a submittal directly from developers of subdivisions that will be served by a pws, or engineers who are on contract to the developer rather than the pws. We have no objections to a pws obligating a developer to provide the time, energy, and cost necessary to prepare a set of plans and specifications, but such shall be reviewed by the pws

for conformance with their own specific requirements prior to submittal, and the submittal to the Division made by the management of the pws rather than others.

Also keep in mind that local agencies approve subdivision plats not the Division; that the plans and specifications submitted shall be final and complete enough for actual construction of the additions or modifications to the pws's existing facilities; that additional information, even beyond that outlined below, may be required by the Division prior to construction (e.g. hydraulic analysis of existing system plus additions, local requirements for fire flow and duration, proximity of sewer and other utilities); and that the plans and specifications must be stamped and signed by a registered professional engineer licensed to practice in the state of Utah.

(1) Project Notification.

The Division shall be notified prior to the construction of any "public drinking water project" as defined in R309-500-5(1) above. The notification may be prior to or simultaneous with submission of construction plans and specifications as required by R309-500-6(2) below. Notification shall be made by the management of the regulated public water system on a form provided by the Division. Information required by this form shall be determined by the Division and may include:

(a) whether the project is for a new or existing public drinking water system,

(b) the professional engineer, registered in the State of Utah, designing the project and his/her experience designing public drinking water projects within the state,

(c) the individual(s) who will be inspecting the project during construction and whether such inspection will be full-time or part time,

(d) whether required approvals or permits from other governmental agencies (e.g. local planning commissions, building inspectors, Utah Division of Water Rights)are awaiting approval by the Director, the agency's name and contact person,

(e) the fire marshal, fire district or other entity having legal authority to specify requirements for fire suppression in the project area,

(f) for community and non-transient non-community public water systems or any public water system treating surface water, the name of the certified operator who is, or will be, in direct responsible charge of the water system,

(g) whether the water system has a registered professional engineer employed, appointed or designated as being directly responsible for the entire system design and his or her name and whether the system is requesting waiving of plan submittal under conditions of R309-500-6 (3),

(h) the anticipated construction schedule, and

(i) a description of the type of legal entity responsible for the water system (i.e. corporation, political subdivision, mutual ownership, individual ownership, etc.) and the status of the entity with respect to the rules of the Utah Public Service Commission.

Guidance: The Utah Public Service Commission (PSC) regulates water utilities meeting the definition of a "water corporation" as found in 54-2-1 of the Utah Code. However, water utilities owned by political subdivisions are not subject to PSC regulation – see U.C. 54-2-1 (29). Mutual water companies serving only their members may obtain a Letter of Exemption from PSC regulation. All public water systems shall refer to Title 54 of the Utah Code and R746-331 of the Utah Administrative Code and approach the PSC for a determination of whether the system qualifies for an exemption from PSC regulation.

(2) Pre-Construction Requirements.

All of the following shall be accomplished before construction of any public drinking water project commences:

(a) Contract documents, plans and specifications for a public drinking water project shall be submitted to the Division at least 30 days prior to the date on which action is desired unless the system is eligible for and has requested waiving of plan submittal. Any submittal shall include engineering reports, pipe network hydraulic analyses, water consumption data, supporting information, evidence of rights-of-way and reference to any previously submitted master plans pertinent to the project, along with a description of a program for keeping existing water works facilities in operation during construction so as to minimize interruption of service.

Guidance: Review of complicated projects, especially water treatment facilities, may require more that 30 days and shall be submitted well in advance of the date on which action is desired.

(b) Plans and specifications shall be prepared for every anticipated public water system project. The design utilized shall conform to the requirements of R309-500 through R309-550. Furthermore, the plans and specification shall be sufficiently detailed to assure that the project shall be properly constructed. Drawings shall be compatible with Division's document storage and microfilming practice. Drawings which are illegible or of unusual size shall not be accepted for review. Drawing size shall not exceed 30" x 42" nor be less than 8-1/2" x 11".

(c) The plans and specifications shall be stamped and signed by a licensed professional engineer in accordance with Section 58-22-602(2) of the Utah Code.

Guidance: 58-22-602(2) in part reads: "Any final plan, specification, and report prepared by, or under the supervision of, the professional engineer shall bear the seal of the professional engineer when submitted to a client, when filed with public authorities, ...". As authorized by 19-4-104(1)(b), the Drinking Water Board may "require the submission to the Director of plans and specifications for construction of, substantial addition to, or alteration of public water systems for review and approval by the board before that action begins and require any modifications or impose any conditions that may be necessary to carry out the purposes of this chapter."

Therefore the Drinking Water Board is considered as the State Authority having regulatory control over public water systems and any submittal tot he board, through the Director, on behalf of a client is considered a filing with public authorities and required to bear the stamp and signature of a professional engineer.

Staff at the Division are repeatedly questioned concerning the need to have a licensed professional engineer stamp and sign sketches, drawings, or plans submitted for review, especially where simple waterline extensions or additions are concerned. 58-22-102(9) of the Utah Code in part defines "Professional engineering or the practice of engineering" as meaning any service or creative work, the adequate performance of which requires engineering education, training, and experience in the application of special knowledge of the mathematical, physical, and engineering sciences to such services or creative work as...planning, design, and design coordination of engineering works and systems...any of which embraces such services or work, either public or private, in connection with any utilities....and including such other professional services as may be necessary to the planning, progress and completion of any engineering services.

The Division, the Director, and the Board cannot waive requirements of other agencies; therefore small public water systems are encouraged to utilize a professional engineer to create a meaningful "master plan" and "standard system drawings", have them reviewed and approved by the Director one time, then they may construct the system in phases by simply notifying the Division, citing the previously approved submittal, and requesting a waiver of our requirement for plans and specifications submittal for the current construction phase as allowed by R309-500-6(3)(a).

(d) Plans and specifications shall be reviewed for conformance with R309-500 through R309-550. No work shall commence on a public water system project until a plan approval has been issued by the Director unless conditions outlined in R309-500-6(3) are met and waiving of plan submittal has been requested. If construction or the ordering of substantial equipment has not commenced within one year, a renewal of the Plan Approval shall be obtained prior to proceeding with construction.

(e) If, in the judgment of the Director, alternate designs or specific solutions can protect the public health to the same or greater extent as achieved in R309-500 through R309-550, the Director may grant an exception thereto (see the third paragraph of R309-500-4(1)).

(f) Novel equipment or treatment techniques may be developed which are not specifically addressed by these rules. These may be accepted by the Director if it can be shown that:

(i) the technique will produce water meeting the requirements of R309-200 of these rules,

(ii) the Director has determined that it will protect public health to the same extent provided by comparable treatment processes outlined in these rules, and

(iii) the Director has determined the technique is as reliable as any comparable treatment process outlined is these rules.

(3) Waiving of Plan Submittal Requirement.

With identification of a professional engineer, as indicated below, on a project notification form the plan submittal requirement may be waived for certain projects. In these instances, in lieu of plans and specifications, a "certification of rule conformance" shall be submitted along with the additional information required for an operating permit (see R309-500-9), signed by the professional engineer identified to Director in (b) or, if the system has not employed, appointed, or designated such, the registered professional engineer who prepared the items in (a). Projects eligible for this waiving of plan submittal are:

(a) distribution system improvements (excluding pressure reducing valve stations and in-line booster pump stations) which conform to a "master plan" previously reviewed and approved by the Director and installed in accordance with the system's standard installation drawings, also previously reviewed and approved by the Director, or

(b) distribution system improvements consisting solely of pipelines and pipeline appurtenances (excluding pressure reducing valve stations and in-line booster pump stations);

(i) less than or equal to 4 inches in diameter in water systems (without fire hydrants) serving solely a residential population less than 3,300;

(ii) less than or equal to 8 inches in diameter in water systems (with fire hydrants) providing water for mixed use (commercial, industrial, agricultural and/or residential) to a population less than 3,300;

(iii) less than or equal to 12 inches in diameter in water systems(with fire hydrants) providing water for mixed use to a population between 3,300 and 50,000;

(iv) less than or equal to 16 inches in diameter in water systems (with fire hydrants) providing water for mixed use to a population greater than 50,000.

Additionally, the above systems in (b) shall employ, appoint or designate a registered professional engineer who is directly responsible for the entire public water system design and identify this individual to the Director as well as have standard installation drawings previously reviewed and approved by the Division before being eligible for waiving of plan submittal requirements.

R309-500-7. Inspection During Construction.

Staff from the Division, or the appropriate local health department, after reasonable notice and presentation of credentials may make visits to the work site to assure compliance with these rules.

Guidance: It is recommended that a full-time inspector(s), familiar with these rules, be retained to observe all construction activities. This is particularly important for buried facilities such as pipelines.

R309-500-8. Change Orders.

Any deviations from approved plans or specifications affecting capacity, hydraulic conditions, operating units, the functioning of water treatment processes, or the quality of water to be delivered, shall be reported to the Director. If deemed appropriate, the Director may require that revised plans and specifications be submitted for review. Revised plans or specifications shall be submitted to the Division in time to permit the review and approval of such plans or specifications before any construction work, which will be affected by such changes, is begun.

R309-500-9. Issuance of Operating Permit.

The Division shall be informed when a public drinking water project, or a well-defined phase thereof, is at or near completion. The new or modified facility shall not be used until an "Operating Permit" is issued, in writing, by the Director. This permit shall not be issued until all of the following items are submitted and found to be acceptable for all projects with the exception of distribution lines (including in-line booster pump stations or pressure reducing stations), which may be placed into service prior to submittal of all items if the professional engineer responsible for the entire system, as identified to the Director, has received items (1) and (4):

(1) a statement from a registered professional engineer that all conditions of Plan Approval were accomplished ("certification of rule conformance"),

(2) as-built "record" drawings; unless no changes are made from previously submitted and approved plans during construction,

(3) confirmation that a copy of the as-built "record" drawings has been received by the water system owner,

(4) evidence of proper flushing and disinfection in accordance with the appropriate ANSI/AWWA Standard,

(5) where appropriate, water quality data

Guidance: When the interior of drinking water storage tanks are painted or otherwise recoated with a material which contains a volatile organic that may be leached into the drinking water we recommend that, to verify the proper curing of the coating, water samples be taken and analyzed for said particular volatile organic constituent of the coating prior to re-introducing any water from the tank into the drinking water system

(6) a statement from the Engineer indicating what changes to the project were necessary during construction, and certification that all of these changes were in conformance with these rules ("certification of rule conformance"),

(7) all other documentation which may have been required during the plan review process, and

(8) confirmation that the water system owner has been provided with an Operation and Maintenance manual for the new facility.

R309-500-10. Adequacy of Wastewater Disposal.

Plans and specifications for new water systems, or facilities required as a result of proposed subdivision additions to existing water systems, shall only be approved if the method(s) of wastewater disposal in the affected area have been approved, or been determined to be feasible, by the Utah Division of Water Quality or the appropriate local health agency.

R309-500-11. Financial Viability.

Owners of new or existing water systems are encouraged to develop realistic financial strategies for recouping the costs of constructing and operating their systems. Plans for water system facilities shall not be approved when it is obvious that public health will eventually be threatened because the anticipated usage of the system will not generate sufficient funds to insure proper operation and maintenance of the system (see also R309-352-5).

Guidance: To permit an evaluation in this regard, capital and operating cost estimates shall be provided along with the engineering plans and specifications for any proposed project.

R309-500-12. Fee Schedule.

The Division may charge a fee for the review of plan and specifications. A fee schedule is available from the Division.

Guidance: If the project involves well grout witness of a new well by Division staff, a Well Grout Sealing Inspection fee of $90.00 per hour (plus mileage and "per diem" food and lodging expenses) is charged to the driller by the Division.

R309-500-13. Other Permits.

Local, county or other state permits may also be necessary before beginning construction of any drinking water project.

R309-500-14. Reference Documents.

All references made in R309-500 through R309-550 are available for inspection at the Division's office.

R309-500-15. Violations of These Rules.

Violations of rule contained in R309-500 through R309-550 are subject to the provisions of the Utah Safe Drinking Water Act (Title 19, Chapter 4 Section 109 of the Utah Code) and may be subject to fines and penalties.

Guidance: Safety

The requirements of the Utah Occupational Safety and Health Administration (UOSHA) shall be met during the construction or operation of public drinking water facilities. However these rules are not enforced by the Division and, furthermore, Division inspections do not include safety-related items.

KEY: drinking water, plan review, operation and maintenance requirements, permits
Date of Enactment or Last Substantive Amendment: May 12, 2009
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309-505. Facility Design and Operation: Minimum Treatment Requirements.

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R309-505. Facility Design and Operation: Minimum Treatment Requirements.

R309-505-1. Purpose.

This rule specifies the type and degree of treatment which must be applied to the various types of water sources found in Utah. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water consistently meeting applicable drinking water quality requirements and do not pose a threat to general public health.

R309-505-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-505-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-505-4. Pre-design Consultation.

The type and degree of treatment which shall be given a public drinking water source depends upon the nature of the source and the chemical and biological characteristics of the water it produces. Prior to the design of any water treatment facility, the Director shall be consulted and concur that the contemplated treatment method is appropriate for the source being treated.

R309-505-5. Drinking Water Quality Standards.

Drinking water provided for human consumption by public drinking water systems must meet all water quality standards as specified in R309-200. Sources of water which do not meet applicable standards, or may not meet such standards due to the proximity of contamination sources, shall be appropriately treated as specified herein or physically disconnected from the drinking water system.

R309-505-6. Surface Water Sources.

(1) Determination of Surface Water Source.

A surface water source is any water source which rests or travels above ground for any period of time. Such sources include rivers, streams, creeks, lakes, reservoirs, ponds or impoundments.

(2) Treatment of a Surface Water Source.

(a) As a minimum, surface water sources shall be given complete treatment as specified in R309-525 or R309-30.

(b) All surface waters shall be treated to assure:

(i) at least 99.9 percent (3-log) removal and/or inactivation of *Giardia lamblia* cysts between a point where the raw water is not subject to re-contamination by surface water runoff and a point downstream before or at the first customer;

(ii) at least 99.99 percent (4-log) removal and/or inactivation of viruses between a point where the raw water is not subject to re-contamination by surface water runoff and a point downstream before or at the first customer; and

(iii) removal of substances, as needed, to comply with the quality requirements of R309-200.

(c) A public water system using a surface water source is considered to be in compliance with the requirements in subsection (b), above, if the treatment technique utilized produces water meeting the quality provisions of R309-200, provided that all monitoring required by R309-215 has been accomplished.

R309-505-7. Low Quality Ground Water Sources.

(1) Determination of a Low Quality Ground Water Source.

(a) A low quality ground water source is any well or spring which, as determined by the Director, cannot reliably and consistently meet the drinking water quality standards described in R309-200. A water source shall be deemed to be a low quality ground water source if any of the following conditions exist:

(i) It is determined by the Director that the source is Ground Water Under the Direct Influence of Surface Water.

(A) Classification of existing ground water sources, as to whether or not they are under direct influence of surface water, shall be made by the Director.

(B) Frequent monitoring of turbidity, temperature, pH and conductivity of

source water, in conjunction with similar monitoring of nearby surface waters may, if properly documented, provide sufficient evidence that the source is not influenced.

(C) Classification of existing sources shall be based upon evaluation of part or all of the following:

(I) Records review; including review of plans and specifications used for construction of collection facilities as submitted for review and approval prior to construction; review of as-built plans as submitted after construction, especially where springs are concerned; review of previous sanitary surveys; and review of any system bacteriological violations which may be linked directly to a source.

(II) Results of written survey form.

(III) On-site inspection by Division personnel.

(IV) Special tests such as Microscopic Particulate Analysis (MPA), dye tracer studies, or time of travel studies done in conjunction with the source protection program. Because of critical timing for tests such as the MPA, accelerated monitoring and reporting of water characteristics as mentioned in R309-505-7 (1)(a)(i)(B) above, may be required prior to MPA sampling.

(b) Testing for microbiological, chemical or radiologic contaminants determines that the drinking water quality requirements of R309-200 cannot be reliably or consistently met.

(c) The location, design or construction of the well or spring makes it, in the judgement of the Director, susceptible to natural or man-caused contamination.

(2) Treatment of a Low Quality Ground Water Source.

Low quality ground water sources shall be treated to assure that all chemical and biological contaminants are reduced to the levels which are reliably and consistently below MCL's prescribed in R309-200. If a source is determined to be ground water under the direct influence of surface water the following is required:

(a) Upon determination that a ground water source is under the direct influence of surface water, conventional surface water treatment, as specified in R309-525,or an approved equivalent, as specified in R309-530, shall be installed within 18 months or the source must be abandoned as a source of drinking water and physically disconnected from the drinking water system.

(b) Systems which must retain use of ground water sources classified as under direct influence of surface water shall start disinfection immediately on those sources and monitor in accordance with residual disinfectant monitoring under treatment plant monitoring and reporting found in R309-215- as well as maintain

satisfactory "CT" values in accordance with R309-200-5(7) during the 18 month interim period before conventional surface water treatment, or an approved equivalent, is installed. Chlorine, chlorine dioxide, chloramine, and ozone are considered capable of attaining required levels of disinfection.

(c) Once a ground water source is classified as under the influence of surface water, it must be considered to be a surface water source. Thus, all requirements in these rules which pertain to surface water sources also pertain to ground water under the direct influence of surface water.

R309-505-8. High Quality Ground Water Sources.

(1) Determination of a High Quality Ground Water Source.

A well or spring shall be deemed to be a high quality ground water source if the following conditions are met:

(a) The design and construction of the source are in conformance with these rules.

(b) Testing establishes that all applicable drinking water quality standards, as given in R309-200, are met, and can be expected to be met in the future

(c) The source is not susceptible to natural or man-caused contamination and, furthermore, adequate protection zones and management areas have been established in accordance with R309-600.

(2) Treatment of a High Quality Ground Water Source.

A high quality ground water source requires no treatment.

R309-505-9. Best Available Technologies (BATs).

EPA has identified Best Available Technologies (BATs) in national regulations regarding drinking water. BATs include Activated Alumina, Coagulation/Filtration, Direct Filtration, Diatomite Filtration, Electrodialysis Reversal, Corrosion Control, Granulated Activated Carbon, Ion Exchange, Lime Softening, Reverse Osmosis, Polymer Addition and Packed Tower Aeration. Where a BAT is used to reduce the concentration of a contaminant:

(a) The requirements of R309-500 through R309-550 shall govern if the BAT is included in these rules.

(b) If the BAT is not included in R309-500 through R309-550, review of plans and specifications for a project will be governed by R309-530-9, New Treatment Processes or Equipment.

R309-505-10. Temporary Use of Bottled Water.

Initially the use of bottled water may be allowed on a temporary basis by the Director. The continued use of bottled water shall be reviewed at least annually and only allowed after the Director is satisfied that the PWS has made reasonable attempts since the last review to provide acceptable water on a more permanent basis without success.

KEY: drinking water, surface water treatment, low quality ground water, high quality ground water
Date of Enactment or Last Substantive Amendment: August 28, 2013
Notice of Continuation: March 22, 2010
Authorizing, and Implemented or Interpreted Law: 19-4-104

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R309-510 Facility Design and Operation: Minimum Sizing Requirements.

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R309-510. Facility Design and Operation: Minimum Sizing Requirements.

R309-510-1. Purpose.

This rule specifies requirements for the sizing of public drinking water facilities such as sources (along with their associated treatment facilities), storage tanks, and pipelines. It is intended to be applied in conjunction with R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-510-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-510-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-510-4. General.

This rule provides estimates of quantities and flow rates which shall be used in the design of new systems, or if there is an absence of data collected by the public water system meeting the required confidence level for a reduction mentioned below, when evaluating water sources, storage facilities and pipelines. Within each of these three broad categories, the designer shall ascertain the contributions on demand from the indoor use of water, the outdoor use of water, and fire suppression activities (if required by local authorities). These components must be added together to determine the total demand on a given facility.

Guidance: Rules in this section are designed to assure that a water system never runs out of water. This is not only an inconvenience for the public, but a risk to public health and safety. When a distribution goes dry, the risk of system contamination from in-leakage and backflow increases. Furthermore, no fire protection would be available. Thus, the design engineer must give careful consideration to the daily and yearly variations of demand and verify that the system facilities are sufficient. Furthermore, the design engineer shall consider how the system

would behave during drought periods when demands may be higher than usual, and source yield (particularly the of springs) will likely be reduced.

R309-510-5. Reduction of Requirements.

If acceptable data are presented, certain number of days of peak day demand to establish minimum source capacity; certain number of years of annual demand to establish minimum water right requirements; and certain number of readings of peak hourly demand to establish minimum peak instantaneous demand; showing that the requirements made herein are excessive for a given project, the requirements may be appropriately reduced to the 90th percentile of readings, on a case by case basis by the Director. In the case of Recreational Home Developments, in order to qualify for a quantity reduction, not only must the actual water consumption be less than quantities required by rule but enforceable policy restrictions must have been approved which prevent the use of such dwellings as a permanent domicile and these restrictions shall have been consistently enforced. The Director may re-consider any reduced minimums if the nature and use of the system changes.

R309-510-6. Water Conservation.

This rule is based upon typical current water consumption patterns in the State of Utah. They may be excessive in certain settings where legally enforceable water conservation measures exist. In these cases the requirements made in this section may be reduced on a case-by-case basis by the Director.

Guidance: Drinking water systems are encouraged to use the water resources of the state wisely. Conservation measures such as low flow toilets and low water demand landscaping (xeriscaping) may significantly reduce the demands on water systems.

R309-510-7. Source Sizing.

(1) Peak Day Demand and Average Yearly Demand.

Sources shall legally and physically meet water demands under two separate conditions. First, they shall meet the anticipated water demand on the day of highest water consumption. This is referred to as the peak day demand. Second, they shall also be able to provide one year's supply of water, the average yearly demand.

Guidance: If the above two criteria are met, the source(s) can be relied upon to adequately serve the system under most, if not all, conditions. The term "legally", above, refers to what is permitted by the owner's water right. The design engineer shall fully investigate the available water rights for a system. Water rights vary in the way they are written. Some are written in "cfs", others are written in terms of "AF". Still others are written in terms of allowable acreage or livestock. Furthermore, water rights may be

restricted to certain times of the year, or certain uses (e.g. irrigation). Consult the Division for assistance in determining how many connections a specific water right may support.

(2) Estimated Indoor Use.

In the absence of firm water use data, Tables 510-1 and 510-2 shall be used to estimate the peak day demand and average yearly demand for indoor water use.

Table 510-1 Source Demand for Indoor Use		
Type of Connection	Peak Day Demand	Average Yearly Demand
Year-Round Use		
Residential	800 gpd/conn	146,000 gal./conn
ERC	800 gpd/ERC	146,000 gal./ERC
Seasonal / Non-Residential Use		
Modern Recreation Camp	60 gpd/person	(see note 1)
Semi-Developed Camp a. With pit privies b. With flush toilets	 5 gpd/person 20 gpd/person	 (See note1) (See note 1)
Hotels, Motel & Resort	150 gpd/unit	(See note1)
Labor Camp	50 gpd/person	(See note1)
Recreational Vehicle Park	100 gpd/pad	(See note1)
Roadway Rest Stop	7 gpd/vehicle	(See note1)
Recreational Home Development	400 gpd/conn	(See note1)

Note 1. Annual demand shall be based on the number of days the system will be open during the year times the peak day demand unless data acceptable to the Director, with a confidence level of 90% or greater showing a lesser annual consumption, can be presented.

TABLE 510-2SOURCE DEMAND FOR INDIVIDUAL ESTABLISHMENTS[(a)] (Indoor Use)	
Type of Establishment	Peak Day Demand (gpd)
Airports a. per passenger b. per employee	 3 15
Boarding Houses a. for each resident boarder and employee b. for each nonresident boarders	 50 10
Bowling Alleys, per alley a. with snack bar b. with no snack bar	 100 85
Churches, per person	5

Country Clubs a. per resident member b. per nonresident member c. per employee	 100 25 15
Dentist's Office a. per chair b. per staff member	 200 35
Doctor's Office a. per patient b. per staff member	 10 35
Fairgrounds, per person	1
Fire Stations, per person a. with full time employees and food prep b. with no full time employees and no food prep	 70 5
Gyms a. per participant b. per spectator	 25 4
Hairdresser a. per chair b. per operator	 50 35
Hospitals, per bed space	250
Industrial Buildings, per 8 hour shift, per employee (exclusive of industrial waste) a. with showers b. with no showers	 35 15
Launderette, per washer	580
Movie Theaters a. auditorium, per seat b. drive-in, per car space	 5 10
Nursing Homes, per bed space	280
Office Buildings & Business Establishments, per shift, per employee (sanitary wastes only) a. with cafeteria b. with no cafeteria	 25 15
Picnic Parks, per person (toilet wastes only)	5
Restaurants a. ordinary restaurants (not 24 hour service) b. 24 hour service c. single service customer utensils only d. or, per customer served (includes toilet and kitchen wastes)	 35 per seat 50 per seat 2 per customer 10
Rooming House, per person	40
Schools, per person a. boarding b. day, without cafeteria, gym or showers	75 15 20

c. day, with cafeteria, but no gym or showers d. day, with cafeteria, gym and showers	25
Service Stations (b), per vehicle served	10
Skating Rink, Dance Halls, etc., per person a. no kitchen wastes b. additional for kitchen wastes	 10 3
Ski Areas, per person (no kitchen waste)	10
Stores a. per public toilet room b. per employee	 500 11
Swimming Pools and Bathhouses(c), per person	10
Taverns, Bars, Cocktail Lounges, per seat	20
Visitors Centers, per visitor	5

NOTES FOR TABLE 510-2:

1. Source capacity must at least equal the peak day demand of the system. Estimate this by assuming the facility is used to its maximum.

2. Generally, storage volume must at least equal one average day's demand.

3. Peak instantaneous demands may be estimated by fixture unit analysis as per Appendix E of the 2006 International Plumbing Code.

(a) When more than one use will occur, the multiple use shall be considered in determining total demand. Small industrial plants maintaining a cafeteria and/or showers and club houses or motels maintaining swimming pools and/or laundries are typical examples of multiple uses. Uses other than those listed above shall be considered in relation to established demands from known or similar installations.

(b) or 250 gpd per pump,

(c) 20 x {Water Area (Ft2) / 30} + Deck Area (Ft2)

(3) Estimated Outdoor Use.

In the absence of firm water use data, Table 510-3 shall be used to estimate the peak day demand and average yearly demand for outdoor water use. The following procedure shall be used:

Guidance: The demand on drinking water sources is related to whether the system supplies water for outdoor use such as the irrigation of lawns and gardens. While the indoor use of water can be expected to remain relatively constant throughout the state, the outdoor use component is highly variable through the year, and is related to the

amount of land irrigated as well as local climatological conditions.

(a) Determine the location of the water system on the map entitled Irrigated Crop Consumptive Use Zones and Normal Annual Effective Precipitation, Utah as prepared by the Soil Conservation Service (available from the Division). Find the numbered zone, one through six, in which the water system is located (if located in an area described "non-arable" find nearest numbered zone).

Guidance: The irrigation zone map is provided below. If you are viewing a printed copy of this rule, the map may be in black and white. A more usable colored version of the map may be viewed or downloaded from:

http://drinkingwater.utah.gov/irrigation_map_intro.htm

Tip: If you are viewing an electronic version of this rule, to make the map more readable use any zoom-in feature which may be available.

(b) Determine the net number of acres which may be irrigated. This is generally done by starting with the gross acreage, then subtract out any area of roadway, driveway, sidewalk or patio pavements along with housing foundation footprints that can be reasonably expected for lots within a new subdivision or which is representative of existing lots. Before any other land area which may be considered "non-irrigated" (e.g. steep slopes, wooded areas, etc.) is subtracted from the gross area, the Director shall be consulted and agree that the land in question will not be irrigated.

Guidance: For instance, in the case of a heavily wooded mountain home subdivision, it may be claimed that large lawns will not be put in by the lot owners. The division must review and concur with this judgment.

(c) Refer to Table 510-3 to determine peak day demand and average yearly demand for outdoor use.

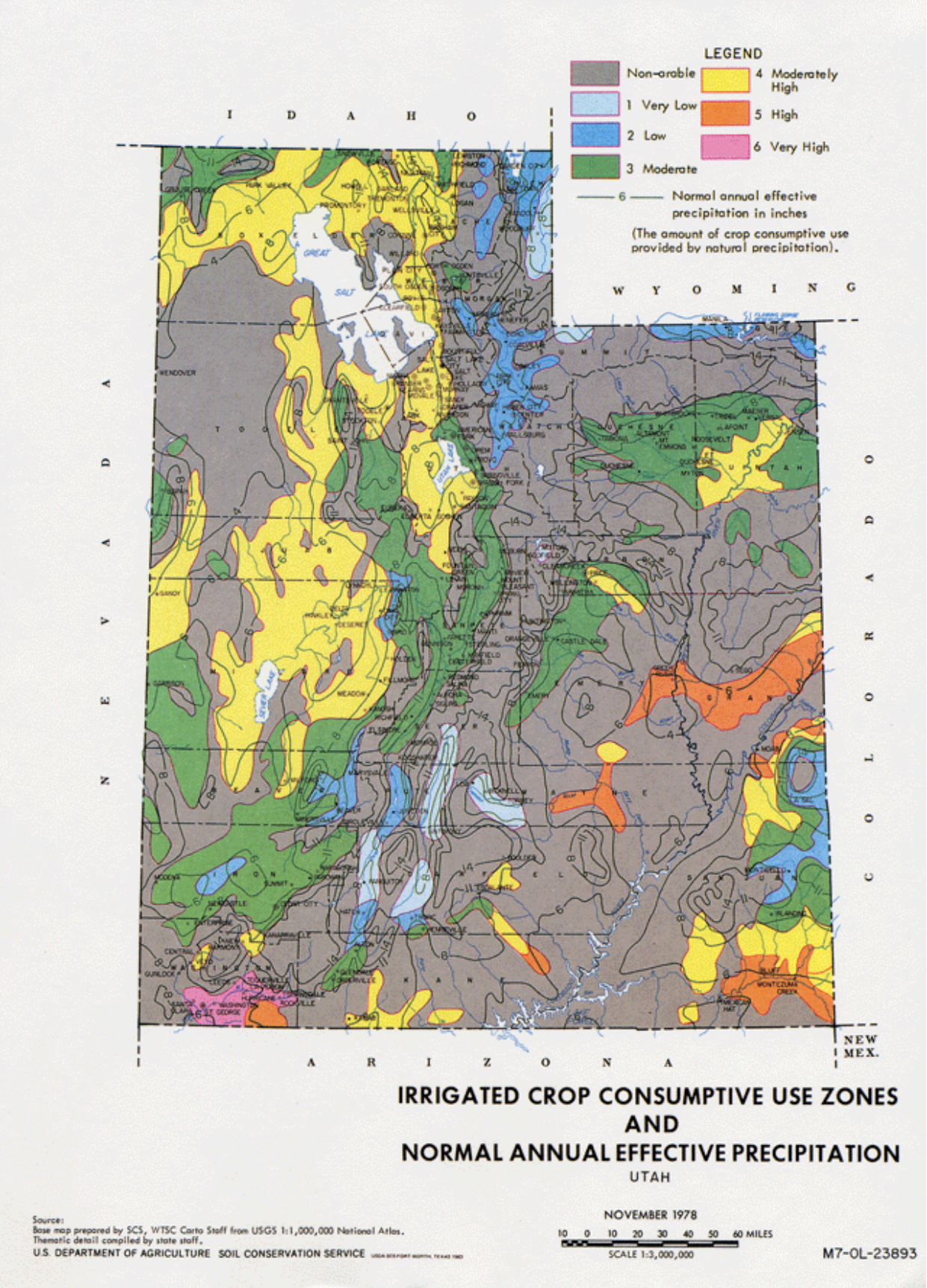
(d) The results of the indoor use and outdoor use tables shall be added together and source(s) shall be legally and physically capable of meeting this combined demand.

Table 510-3 Source Demand for Irrigation (Outdoor Use)		
Map Zone	Peak Day Demand(gpm/irrigated acre)	Average Yearly Demand(AF/ irrigated acre)
1	2.26	1.17
2	2.80	1.23
3	3.39	1.66
4	3.96	1.87
5	4.52	2.69
6	4.90	3.26

(4) Accounting for Variations in Source Yield.

The design engineer shall consider whether flow from the source(s) may vary. Where flow varies, as is the case for most springs, the minimum flow rate shall be used in determining the number of connections which may be supported by the source(s). Where historical records are sufficient, and where peak flows from the source(s) correspond with peak demand periods, the Director may grant an exception to this requirement.

Guidance: The design engineer is cautioned to thoroughly investigate spring behavior. During dry periods, springs (particularly those at higher elevations) may drastically decrease in flow. In assessing minimum flowrates of springs, watersheds shall be assumed to have received only 80% of normal precipitation.


LEGEND
Non-arable
1 Very Low
2 Low
3 Moderate
4 Moderately High
5 High
6 Very High
6 Normal annual effective precipitation in inches
(The amount of crop consumptive use provided by natural precipitation).
IDAHO
WYOMING
COLORADO
NEVADA
ARIZONA
NEW MEX.
IRRIGATED CROP CONSUMPTIVE USE ZONES
AND
NORMAL ANNUAL EFFECTIVE PRECIPITATION
UTAH
NOVEMBER 1978
10 0 10 20 30 40 50 60 MILES
SCALE 1:3,000,000
Source:
Base map prepared by SCS, WTSC Carto Staff from USGS 1:1,000,000 National Atlas.
Thematic detail compiled by state staff.
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
M7-OL-23893

R309-510-8. Storage Sizing.

(1) General.

Each storage facility shall provide:

(a) equalization storage volume, to satisfy average day demands for water for indoor use as well as outdoor use,

(b) fire suppression storage volume, if the water system is equipped with fire hydrants and intended to provide fire suppression water, and

(c) emergency storage, if deemed appropriate by the water supplier or the Director, to meet demands in the event of an unexpected emergency situation such as a line break or a treatment plant failures.

(2) Equalization Storage.

(a) All public drinking water systems shall be provided with equalization storage. The amount of equalization storage which must be provided varies with the nature of the water system, the extent of outdoor use and the location of the system.

(b) Required equalization storage for indoor use is provided in Table 510-4. Storage requirements for non-community systems not listed in this table shall be determined by calculating the average day demands from the information given in Table 510-2.

Table 510-4 Storage Volume for Indoor Use	
Type	Volume Required(gallons)
Community Systems	
Residential; per single resident service connection	400
Non-Residential; per Equivalent Residential Connection (ERC)	400
Non-Community Systems	
Modern Recreation Camp; per person	30
Semi-Developed Camp; per person a. with Pit Privies b. with Flush Toilets	 2.5 10
Hotel, Motel, & Resorts; per unit	75
Labor Camp; per unit	25
Recreational Vehicle Park; per pad	50
Roadway Rest Stop; per vehicle	3.5
Recreational Home Development; per connection	400

(c) Where the drinking water system provides water for outdoor use, such as the irrigation of lawns and gardens, the equalization storage volumes estimated in Table 510-5 shall be added to the indoor volumes estimated in Table 510-4. The procedure for determining the map zone and irrigated acreage for using Table 510-5 is outlined in Section R309-510-7(3).

Table 510-5 Storage Volume for Outdoor Use	
Map Zone	Volume Required (gallons/irrigated acre)
1	1,782
2	1,873
3	2,528
4	2,848
5	4,081
6	4,964

(3) Fire Suppression Storage.

Fire suppression storage shall be required if the water system is intended to provide fire fighting water as evidenced by fire hydrants connected to the piping. The design engineer shall consult with the local fire suppression authority regarding needed fire flows in the area under consideration. This information shall be provided to the Division. Where no local fire suppression authority exists, needed fire suppression storage shall be assumed to be 120,000 gallons (1000 gpm for 2 hours).

Guidance: The 1991 Uniform Fire Code has been adopted statewide in Utah. However, local authorities are authorized to deviate from this code if it can be justified. Normal fire storage volume is given in Table A-III-A-1 of the code. According to this table, flow duration must be 2 to 4 hours depending on the size and type of structure which must be protected. Fire flow storage for a one or two family dwelling of less than 3,600 square feet would be 120,000 gallons (1,000 gpm x 120 minutes).Larger volumes would be required for other structures.

(4) Emergency Storage.

Emergency storage shall be considered during the design process. The amount of emergency storage shall be based upon an assessment of risk and the desired degree of system dependability. The Director may require emergency storage when it is warranted to protect public health and welfare.

Guidance: It is advisable to provide water storage for emergency situations, such as pipeline failures, major trunk main failures, equipment failures, electrical power outages, water treatment facility failures, raw-water supply contamination, or natural

disasters. Generally, the need for emergency storage shall be determined by the water supplier and design engineer.

R309-510-9. Distribution System Sizing.

(1) General Requirements.

The distribution system shall be designed to insure that minimum water pressures as required in R309-105-9 exist at all points within the system. If the distribution system is equipped with fire hydrants, the Division will require a letter from the local fire authority stating the fire flow and duration required of the area to insure the system shall be designed to provide minimum pressures as required in R309-105-9 to exist at all points within the system when needed fire flows are imposed upon the peak day demand flows of the system.

(2) Indoor Use, Estimated Peak Instantaneous Demand.

(a) For community water systems and large non-community systems, the peak instantaneous demand for each pipeline shall be assumed for indoor use as:

$Q = 10.8 \times N0.64$

where N equals the total number of ERC's, and Q equals the total flow (gpm) delivered to the total connections served by that pipeline.

Guidance: The equation above shall only be used to estimate the flow required for N connections from a single pipeline and shall not be used to estimate node or junction demands utilized in hydraulic analyses.

For Recreational Vehicle Parks, the peak instantaneous flow for indoor use shall be based on the following:

Table 510-6 Peak Instantaneous Demand for Recreational Vehicle Parks	
Number of Connections	Formula
0 to 59	Q=4N
60 to 239	$Q= 80+ 20N^{0.5}$
240 or greater	Q= 1.6N

NOTES FOR TABLE 510-6:

Q is total peak instantaneous demand (gpm) and N is the

maximum number of connections. However, if the only water use is via service buildings the peak instantaneous demand shall be calculated for the number of fixture units as presented in Appendix E of the 2006 International Plumbing Code.

(b) For small non-community water systems the peak instantaneous demand to be estimated for indoor use shall be calculated on a per-building basis for the number of fixture units as presented in Appendix E of the 2006 International Plumbing Code.

(3) Outdoor Use, Estimated Peak Instantaneous Demand.

Peak instantaneous demand to be estimated for outdoor use is given in Table 510-7. The procedure for determining the map zone and irrigated acreage for using Table 510-7 is outlined in Section R309-510-7(3).

Table 510-7 Peak Instantaneous Demand for Outdoor Use	
Map Zone	Peak Instantaneous Demand (gpm/irrigated acre)
1	4.52
2	5.60
3	6.78
4	7.92
5	9.04
6	9.80

(4) Fire Flows.

(a) Distribution systems shall be designed to deliver needed fire flows if fire hydrants are provided. The design engineer shall consult with the local fire suppression authority regarding needed fire flows in the area under consideration. This information shall be provided to the Division. Where no local fire suppression authority exists, needed fire flows shall be assumed to be 1000 gpm unless the local planning commission provides a letter indicating that the system will not be required to provide any fire flows, in which case fire hydrants will not be allowed to be installed on any mains.

Guidance: Generally, fire flows shall be as required by Appendix B of the 2003 International Fire Code. According to this appendix, minimum fire flow for a one or two family dwelling not exceeding 3,600 square* feet is *1,000 gpm. Fire flows for other types of buildings are higher. The 2003 International Fire Code has been adopted statewide in Utah. However, local authorities are authorized to deviate from this code if it can be justified.

(b) If a distribution system is equipped with fire hydrants, the system shall be designed to insure that minimum pressures required by R309-105-9 exist at all points within the system when fire flows are added to the peak day demand of the system. Refer to Section R309-510-7 for information on determining the peak day demand of the system.

KEY: drinking water, minimum sizing, water conservation
Date of Enactment or Last Substantive Amendment: August 28, 2013
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R309-511. Hydraulic Modeling Requirements

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R309. Environmental Quality, Drinking Water.

R309-511. Hydraulic Modeling Requirements.

R309-511-1. Purpose.

The purpose of this rule is to ensure that the increased water demand created by new construction will not adversely affect existing or new water users. This will be accomplished by requiring the public water system or its agent to evaluate the water delivery system using a hydraulic model and by certifying to the Director that the project will not adversely impact the system. It is intended that the public water system or its agent will use the findings of the hydraulic model to design improvements providing satisfactory service to both existing and new water users. This rule requires the public water system or its agent to certify that the design meets minimum flow requirements of R309-510 and pressure requirements as set forth in rule R309-105-9.

R309-511-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-511-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

"The public water system or its agent" is the individual responsible for signing the certification and preparing the Hydraulic Modeling Design Elements Report. This individual shall be a registered professional engineer, licensed to practice in the State of Utah.

R309-511-4. General.

(1) Rule Applicability.

(a) This rule applies to public drinking water systems categorized as community water systems as defined by rule R309-100-4(2), and to non-transient non-community water systems that have system demands higher than required by R309-510 or with demands for fire suppression. All public drinking water systems are still required to comply with R309-550-5 with respect to water main design, which may require a hydraulic analysis. Submission of the Hydraulic Model

Report, as defined in R309-511-7 and 8, is not required for projects meeting one of the following criteria:

(i) public drinking water projects that will not result in negative hydraulic impact, such as, but not limited to;

(A) addition of new sources in accordance with R309-515;

(B) adding disinfection, fluoridation, or other treatment facilities that do not adversely impact flow, pressure or water quality;

(C) storage tank repair or recoating;

(D) water main additions with no expansion of service (e.g., looping lines);

(E) adding transmission lines to storage or sources without adding service connections;

(F) adding pump station(s) from source or storage upstream of distribution service connections; or,

(G) public drinking water projects that have negligible hydraulic impact as determined by the Director.

(ii) public drinking water projects that are a part of a planned phase of a master plan previously approved by the Director per R309-500-6(3)(a);

(iii) the water system maintains and updates a hydraulic model of the system, and has designated a professional engineer responsible for overseeing the hydraulic analysis in meeting the requirements of R309-511 in writing to the Director; or,

(iv) the water system has a means that is deemed acceptable by the Director to gather real-time data indicative of hydraulic conditions in model scenarios of R309-511-5(9), and the real-time data show the system is capable of meeting the flow and pressure requirements for the additional demands placed on the existing system.

(b) Professional Engineer's certification of the hydraulic modeling results, as defined in R309-511-4(2)(c) and R309-511-6(1), shall be part of the submission of plans for any public drinking water project as defined in R309-500-5(1) except for the projects listed under R309-511-4(1)(a)(i).

(c) A public water system must clearly identify the reason in the plan submittal if it wishes to demonstrate that R309-511 does not apply to a new construction project. In some cases, supporting documentation may be needed.

(d) If there are existing deficiencies in the water system, the Director may allow a new construction project to proceed in accordance with the plan review requirements in R309-500 through 550 as long as the public water system demonstrates that the new construction project is located in a hydraulically separated area and does not adversely impact the existing deficiencies, or does not create new deficiencies within the water system.

(2) Rule Elements.

The public water system or its agent, in connection with the submission of plans and specifications to the Director, shall perform the following:

(a) conduct a hydraulic modeling evaluation consistent with the requirements as set forth in this rule and R309-510. This model shall include either the entire public drinking water system or the specific areas affected by the new construction if hydraulically separated areas exist within the water system;

(b) calibrate the model using field measurements and observations;

(c) certify in writing to the Director that the design complies with the sizing requirements of R309-510 and the minimum water pressures of R309-105-9;

(d) prepare and submit a Hydraulic Model Design Elements Report (see R309-511-7); and,

(f) prepare a System Capacity and Expansion Report if required (see R309-511-8).

R309-511-5. Requirements for the Hydraulic Model.

The following minimum requirements must be incorporated into hydraulic models that are constructed to meet these requirements:

(1) include at least 80 percent of the total pipe lengths in the distribution system affected by the proposed project;

(2) account for 100 percent of the flow in the distribution system affected by the proposed project. Water demand allocation must account for at least 80 percent of the flow delivered by the distribution system affected by the proposed project if customer usage in the system is metered;

(3) include all 8-inch diameter and larger pipes. Pipes smaller than 8-inch diameter shall also be included if they connect pressure zones, storage facilities, major demand areas, pumps, and control valves, or if they are known or expected to be significant conveyers of water such as fire suppression demand. Model piping does not need to include service lateral piping;

(4) include all pipes serving areas at higher elevations, dead ends, remote areas of a distribution system, and areas with known under-sized pipelines;

(5) include all storage facilities and accompanying controls or settings applied to govern the open/closed status of the facility that reflect standard operations;

(6) if applicable, include all pump stations, drivers (constant or variable speed), and accompanying controls or settings applied to govern their on/off/speed status that reflect various operating conditions and drivers;

(7) include all control valves or other system features that could significantly affect the flow of water through the distribution system (e.g., interconnections with other systems and pressure reducing valves between pressure zones) reflecting various operating conditions;

(8) impose peak day and peak instantaneous demands to the water system's facilities. These demands may be peak day and peak instantaneous demands per R309-510, the reduced demand approved by the Director per R309-510-5, or the demands experienced by the water system that are higher than the values listed in R309-510. This may require multiple model simulations to account for the varying water demand conditions. In some cases, extended period simulations are needed to evaluate changes in operating conditions over time. This will depend on the complexity of the water system, extent of anticipated fire event and nature of the new expansion;

(9) calibrate the model to adequately represent the actual field conditions using field measurements and observations;

(10) if fire hydrants are connected to the distribution system, account for fire suppression requirements specified by local fire authority or use the default values stated in R309-510-9(4). For significant fire suppression demand, extended simulations must contain the run time for the period of the anticipated fire event. In some cases, a steady-state model may be sufficient for residential fire suppression demand; and,

(11) account for outdoor use, such as irrigation, if the drinking water system supplies water for outdoor use.

R309-511-6. Elements of the Public Water System or Its Agent's Certification.

(1) The public water system or its agent's certification. The Director relies upon the professional judgment of the registered professional engineer who certifies that the hydraulic analysis and evaluation have been done properly and that the flow and pressure requirements have been met. The public water system or its agent shall, after a thorough review, submit a document to the Director certifying that the following requirements have been met:

(a) the hydraulic model requirements as set forth in rule R309-511-5;

(b) the appropriate demand requirements as specified in this rule and rule R309-510 have been used to evaluate various operating conditions of the public drinking water system;

(c) the hydraulic model predicts that new construction will not result in any service connection within the new expansion area not meeting the minimum distribution system pressures as specified in R309-105-9;

(d) the hydraulic model predicts that new construction will not decrease the pressures within the existing water system such that the minimum distribution system pressures are not met, as specified in R309-105-9;

(e) the calibration methodology is described and the model is sufficiently accurate to represent conditions likely to be experienced in the water delivery system; and,

(f) identify the hydraulic modeling method, and if computer software was used, the software name and version used.

(2) The format of the public water system or its agent's submission.

The public water system or its agent shall submit to the Director the following documentation:

(a) the certification as required in R309-511-6(1). The certification shall be signed, dated, and stamped by a registered professional engineer, licensed to practice in the State of Utah;

(b) a Hydraulic Model Design Elements Report (see R309-511-7). The document shall be signed, dated, and stamped by a registered professional engineer, licensed to practice in the State of Utah; and,

(c) for community public water systems, the water system management shall certify that they have received a copy of input and output data for the hydraulic model with the simulation showing the worst case results in terms of water system pressure and flow.

(3) The submission of supporting documentation.

The public water system or its agent shall submit a System Capacity and Expansion Report (see R309-511-8) if requested by the Director. The document shall be signed, dated, and stamped by a registered professional engineer, licensed to practice in the State of Utah.

R309-511-7. Hydraulic Model Design Elements Report.

The public water system or its agent shall prepare a Hydraulic Model Design Elements Report along with, and in support of, the certification stated in R309-511-6(1). The Hydraulic Model Design Elements Report shall contain, but is not limited to, the following elements:

(1) if the public drinking water system provides water for outdoor use, the report must describe the criteria used to estimate this demand. If the irrigation demand map in R309-510-7(3) is not used, the report shall provide justification for the alternative demands used in the model. If the irrigation demands are based on the map in R309-510-7(3) the report must identify the irrigation zone number, a statement and/or map of how the irrigated acreage is spatially distributed, and the total estimated irrigated acreage. The indicated irrigation demands must be used in the model simulations;

(2) the total number of connections served by the water system including existing connections and anticipated new connections served by the water system after completion of the construction of the project;

(3) the total number of equivalent residential connections (ERC) including both existing connections as well as anticipated new connections associated with the project. The number of ERCs must include high as well as low-volume water users. The determination of the ERCs shall be based on flow requirements using the anticipated demand as outlined in R309-510, or based on alternative sources of information that are deemed acceptable by the Director;

(4) the methodology used for calculating demand and allocating it to the model; a summary of pipe length by diameter; a hydraulic schematic of the distribution piping showing pressure zones, general pipe connectivity between facilities and pressure zones, storage, elevation and sources; and a list or ranges of values of the friction coefficient used in the hydraulic model according to pipe material and condition in the system. All coefficients of friction used in the hydraulic analysis shall be consistent with standard practices;

(5) a statement stating either "yes fire hydrants exist or will exist within the system" or "there are no fire hydrants connected to the system and there is no plan to add fire hydrants with this project." Either statement will require the identification of the local fire authority's name, address, and contact information, as well as the fire flow quantity and duration if required;

(6) the locations of the lowest pressures within the distribution system, and areas identified by the hydraulic model as not meeting each scenario of the minimum pressure requirements in R309-105-9; and,

(7) calibration method and quantitative summary of the calibration results (e.g., comparison tables, graphs).

R309-511-8. System Capacity and Expansion Report.

The public water system or its agent may be required to prepare a System Capacity and Expansion Report along with a Hydraulic Model Design Elements Report, as specified above, in support of the certification. It is intended that the System Capacity and Expansion Report be prepared, maintained, and used by the public water system's management to make informed decisions about its capability to provide water service to future customers and need only be submitted to the Division if requested by the Director. The System Capacity and Expansion Report shall consist of the elements described in R309-110-4 under the definition of "Master Plan" and shall be updated if significant growth or changes to the water system have occurred.

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R309-515 Source Development

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R309. Environmental Quality, Drinking Water.

R309-515. Facility Design and Operation: Source Development.

R309-515-1. Purpose.

This rule specifies requirements for public drinking water sources. It is intended to be applied in conjunction with R309-500 through R309-550. Collectively, these rules govern the design, construction, operation, and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water that consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-515-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code Annotated and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-515-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110, but may be further clarified herein.

R309-515-4. General.

(1) Issues to be Considered.

The selection, development, and operation of a public drinking water source must be done in a manner that will protect public health and assure that all required water quality standards, as described in R309-200, are met.

Guidance: Among the issues which should be considered before source selection and any preparation of development plans are the following:

(2) Communication with the Division.

Because of the issues described above in (1), engineers are advised to work closely with the Division to help assure that sources are properly sited, developed, and operated.

(3) Number of Sources and Quantity Requirements.

Community water systems serving more than 100 connections shall have a minimum of two sources, except where served by a surface water treatment plant. For all systems, the total developed source capacity shall equal or exceed the peak day demand of the system. Refer to R309-510-7 of these rules for procedure to estimate the peak day demand.

(4) Quality Requirements.

In selecting a source of water for development, the designing engineer shall demonstrate to the satisfaction of the Director that the source(s) selected for use in public water systems are of satisfactory quality, or can be treated in a manner so that the quality requirements of R309-200 can be met.

(5) Initial Analyses.

All new drinking water sources, unless otherwise noted below, shall be analyzed for the following:

(a) all the primary and secondary inorganic contaminants listed in R309-200, Table 200-1 and Table 200-5 (excluding Asbestos unless it would be required by R309-205-5(2) ;

(b) Ammonia as N; Boron; Calcium; Copper; Lead; Magnesium; Potassium; Turbidity, as NTU; Specific Conductivity at 25 degrees Celsius, micro hos/cm; Bicarbonate; Carbon Dioxide; Carbonate; Hydroxide; Phosphorous, Ortho as P; Silica, dissolved as SiO2; Surfactant as MBAS; Total Hardness as CaCO3; and Alkalinity as CaCO3;

(c) pesticides, PCBs and SOCs as listed in R309-200-5(3)(a), Table 200-2 unless the system is a transient non-community PWS or, if a community PWS or non-transient non-community PWS, has received waivers in accordance with R309-205-6(1)(f). The following six constituents have been excused from monitoring in the State by the EPA, dibromochloropropane, ethylene dibromide, Diquat, Endothall, glyphosate and Dioxin;

(d) VOCs as listed in R309-200-5(3)(b), Table 200-3 unless the system is a transient non-community PWS; and,

(e) radiologic chemicals as listed in R309-200-5(4) unless the system is a non-transient non-community PWS or a transient non-community PWS.

All analyses shall be performed by a certified laboratory as required by R309-205-4 (Specially prepared sample bottles are required),

(6) Source Classification.

Subsection R309-505-7(1)(a)(i) provides information on the classification of water sources. The Director shall classify all existing or new sources as either:

(a) surface water or ground water under direct influence of surface water which requires conventional surface water treatment or an approved equivalent; or as,

(b) ground water not under the direct influence of surface water.

(7) Latitude and Longitude.

The latitude and longitude, to at least the nearest second, or the location by section, township, range, and course and distance from an established outside section corner or quarter corner of each point of diversion shall be submitted to the Director prior to source approval.

R309-515-5. Surface Water Sources.

(1) Definition.

A surface water source, as is defined in R309-110, shall include, but not be limited, to tributary systems, drainage basins, natural lakes, artificial reservoirs, impoundments and springs or wells that have been classified as being directly influenced by surface water. Surface water sources will not be considered for culinary use unless they can be rendered acceptable by conventional surface water treatment or other equivalent treatment techniques acceptable to the Director.

(2) Pre-design Submittal.

The following information must be submitted to the Director and approved in writing before commencement of design of diversion structures and/or water treatment facilities:

(a) a copy of the chemical analyses required by R309-200 and described in R309-515-4(5) above; and,

(b) a survey of the watershed tributary to the watercourse along which diversion structures are proposed. The survey shall include, but not be limited to:

(i) determining possible future uses of impoundments or reservoirs;

(ii) the present stream classification by the Division of Water Quality, any obstacles to having stream(s) reclassified 1C, and determining degree of watershed control by owner or other agencies;

(iii) assessing degree of hazard to the supply by accidental spillage of materials that may be toxic, harmful or detrimental to treatment processes;

(iv) obtaining samples over a sufficient period of time to assess the microbiological, physical, chemical and radiological characteristics and variations of the water;

(v) assessing the capability of the proposed treatment process to reduce contaminants to applicable standards; and,

(vi) consideration of currents, wind and ice conditions, and the effect of tributary streams at their confluence.

(3) Pre-construction Submittal.

Following approval of a surface water source, the following additional information must be submitted for review and approval prior to commencement of construction:

(a) acceptable evidence that the water system has a legal right to divert water for the proposed uses from the proposed sources;

(b) minimum quantity that the surface water source is capable of producing (see R309-515-5(4)(a) below); and,

(c) complete plans and specifications and supporting documentation for the proposed treatment facilities to ascertain compliance with R309-525 or R309-530.

(4) Quantity.

The quantity of water from surface sources shall:

(a) be assumed to be no greater than the low flow of a 25-year recurrence interval or the low flow of record for these sources when 25 years of records are not available;

(b) meet or exceed the anticipated peak day demand for water as estimated in R309-510-7 and provide a reasonable surplus for anticipated growth; and,

(c) be adequate to compensate for all losses such as silting, evaporation, seepage, and sludge disposal, which would be anticipated in the normal operation of the treatment facility.

(5) Diversion Structures.

Design of intake structures shall provide for:

(a) withdrawal of water from more than one level if quality varies with depth;

(b) intake of lowest withdrawal elevation located at sufficient depth to be kept submerged at the low water elevation of the reservoir;

(c) separate facilities for release of less desirable water held in storage;

(d) occasional cleaning of the inlet line;

(e) a diversion device capable of keeping large quantities of fish or debris from entering an intake structure; and,

(f) suitable protection of pumps where used to transfer diverted water (refer to R309-540-5).

(6) Impoundments.

The design of an impoundment reservoir shall provide for, where applicable:

(a) removal of brush and trees to the high water level;

(b) protection from floods during construction;

(c) abandonment of all wells, which may be inundated (refer to applicable requirements of the Division of Water Rights); and,

(d) adequate precautions to limit nutrient loads.

R309-515-6. Ground Water - Wells.

(1) Required Treatment.

If properly developed, water from wells may be suitable for culinary use without treatment. A determination concerning whether treatment may be required can only be made after the source has been developed and evaluated.

(2) Standby Power.

Water suppliers shall assess the capability of their system in the event of a power outage. If a community water system has no naturally flowing water sources such as springs or flowing wells, one or more of the system's sources shall be equipped for operation during power outages. In this event:

(a) to ensure continuous service when the primary power has been interrupted, a redundant power supply shall be provided. A redundant power supply may include a transfer switch for auxiliary power such as a generator or a power supply service with coverage from two independent substations.

(b) when automatic pre-lubrication of pump bearings is necessary, and an auxiliary power supply is provided, the pre-lubrication line shall be provided with a valved by-pass around the automatic control, or the automatic control shall be wired to the emergency power source.

(3) The Utah Division of Water Rights.

The Utah Division of Water Rights (State Engineer's Office) regulates the drilling of water wells. Before the drilling of a well commences, the well driller must receive a start card from the State Engineer's Office. For public drinking water supply wells, the rules of R655-4 apply and shall be followed in addition to these rules.

Guidance: The most current set of Administrative Rules for Water Well Drillers should be consulted for additional well drilling information. The engineer and driller should be aware that requirements governing the design of public drinking water wells, as described herein, are generally more stringent than requirements of the State Engineer's Office.

(4) Source Protection.

Public drinking water systems are responsible for protecting their sources from contamination. The selection of a well location shall only be made after consideration of the requirements of R309-600. Sources shall be located in an area that will minimize threats from existing or potential sources of pollution.

Generally, sewer lines may not be located within zone one and zone two of a public drinking water system's source protection zones. However, if the following precautions are taken, sewer lines may be permitted within a public drinking water system's source protection zone one and zone two. Sewer lines shall meet the conditions identified in R309-600-13(3), and shall be specially constructed as follows throughout zone one in aquifers classified as protected, and zones one and two, if the aquifer is classified as unprotected.

(a) Sewer lines shall be constructed to remain watertight. The lines shall be deflection-tested in accordance with the Division of Water Quality Rule R317-3. The lines shall be video-inspected for any defect following completion of construction and before being placed in service. The sewer pipe material shall be:

(i) high density polyethylene (HDPE) pipe with a PE3408 or PE4710 rating from the Plastic Pipe Institute and have a Dimension Ratio (DR) of 17 or less, and all joints shall be fusion-welded; or,

(ii) polyvinyl chloride (PVC) pipe meeting AWWA Specification C900 or C905 and have a DR of 18 or less. PVC pipe shall be either restrained gasketed joints or shall be fusion-welded. Solvent cement joints shall not be acceptable. The PVC pipe shall be clearly identified when installed, by marking tape or other means as a sanitary sewer line; or,

(iii) ductile iron pipe with ceramic epoxy lining, polyethylene encasement, restrained joints, and a minimum pressure class of 200.

(b) Procedures for leakage tests shall be specified and comply with Division of Water Quality Rule R317-3 requirements.

(c) Lateral to main connection shall be fusion-welded, shop-fabricated, or saddled with a mechanical clamping watertight device designed for the specific pipe.

(d) Inlet and outlet sewer pipes shall be joined to a manhole with a gasketed flexible watertight connection.

(e) The sewer pipe shall be laid with no greater than 2 percent deflection at any joint.

(f) Backfill shall be compacted to not less than 95 percent of maximum laboratory density as determined in accordance with ASTM Standard D-690.

(g) Sewer manholes shall meet the following requirements.

(i) The manholes shall be constructed of reinforced concrete.

(ii) Manhole base and walls, up to a point at least 12 inches above the top of the upper most sewer pipe entering the manhole, shall be fabricated in a single concrete pour without joints.

(iii) The manholes shall be air pressure tested after installation.

(h) In unprotected aquifers, an impermeable cutoff wall shall be constructed in all sewer trenches on the up-gradient edge of zone two. In protected aquifers, an impermeable cutoff wall shall be constructed in all sewer trenches on the up-gradient edge of zone one.

(5) Outline of Well Approval Process.

(a) Well drilling shall not commence until both of the following items are submitted and receive a favorable review:

(i) a Preliminary Evaluation Report on source protection issues as required by R309-600-13, and

(ii) engineering plans and specifications governing the well drilling, prepared by a licensed well driller holding a current Utah Well Drillers License or prepared, signed, and stamped by a licensed professional engineer or professional geologist licensed to practice in Utah.

(b) Inspection of Well Sealing During Construction.

(i) Authorized Individuals

(A) The following individuals are authorized to witness the well sealing procedure for a public drinking water well:

(I) an engineer or a geologist from the Division of Drinking Water;

(II) a district engineer of the Department of Environmental Quality;

(III) an authorized representative of the Division of Water Rights; or,

(IV) an individual having written authorization from the Director and meeting the below listed criteria.

(B) At the time of the well sealing an individual, who is authorized per (i)(A)(IV), shall present to the well driller a copy of the letter authorizing him or her to witness a well sealing on behalf of the Division of Drinking Water. A copy of this letter shall be appended to the witness certification letter.

(C) At least three days before the anticipated well sealing, the well driller shall arrange for an authorized witness listed in (i)(A) above to witness the procedure. (See R309-515-6(6)(i)).

(ii) Obtaining Authorization

(A) To be authorized per (i)(A)(IV) above to witness a well sealing procedure, an individual must have no relationship to the driller or the well's owner. The individual must have at least five years professional experience designing wells, supervising well drilling or other equivalent experience associated with well drilling or well sealing that is acceptable to the Director.

(B) Individuals, desiring the Director’s authorization to witness a well sealing procedure, shall provide the following information to the Director for review over his or her signature attesting to the correctness of the information:

(I) a detailed description of the applicant's experience with well drilling projects, including number of years of experience and type of work. Three references confirming this professional experience are required.

(II) evidence of licensure as a professional engineer or professional geologist in Utah.

(III) no relationship may exist between a person authorized to witness well sealings and a well driller that would serve as the basis for suspicion of favoritism, leniency, or punitive action in the performance of this task. Examples of such relationships would be family; former long-term employment associations; business partnerships, either formal or informal; etc. The Director’s decision, with right of appeal as provided in R305-7, shall be accepted relative to what constitutes a conflict of interest or a relationship sufficient to disqualify an applicant from all or specific witness opportunities.

(IV) An acknowledgement that he/she would not be acting as an agent or employee of the State of Utah and any losses

incurred while acting as a witness would not be covered by governmental immunity or Utah's insurance.

(V) Willingness to follow established protocols and attend such training events as may be required by the Director.

(VI) Complete with a minimum 75 percent passing grade, an examination on water well drilling rules, as offered by the Division of Water Rights.

(C) The Director may rescind the authorization if an individual fails to comply with the criteria or conditions of authorization listed above.

Guidance: A conflict of interest occurs whenever a duty, such as acting in the interest of the public, intersects with a personal desire (either positive or negative), such as monetary gain or a personal relationship, requiring a decision to be made between them. Each individual faced with a conflict between acting in the public's interest or acting for personal benefit is expected to act in the public's interest as it relates to sealing a well. Questions relating to possible conflicts may be referred to the Director.

(iii) Well Seal Certification

The individual witnessing the well sealing procedure shall provide a signed letter, including the following information, to the Director within 30 days of the well sealing:

(A) certification that the well sealing procedure met all the requirements of Rule R309-515-6(6)(i);

(B) the water right under which the well was drilled and the well driller's license number;

(C) the public water system name (if applicable);

(D) the latitude and longitude of the well and method used for its determination;

(E) the well head's approximate elevation;

(F) casing diameter(s), length(s), and material(s);

(G) the size of the annulus between the borehole and casing;

(H) a description of the sealing process including the sealing material used, its volume, density, method of placement, and depth from surface; and,

(I) the names and company affiliations of other individuals observing the sealing procedure including, but not limited to, the well driller, the well owner, and/or a consultant.

(c) After completion of the well drilling, the following information shall be submitted and receive a favorable review before water from the well can be introduced into a public water system:

(i) a copy of the "Report of Well Driller" as required by the State Engineer's Office which is complete in all aspects and has been stamped as received by the same;

(ii) a copy of the letter from the authorized individual described in R309-515-6(5)(b) above, indicating inspection and confirmation that the well was grouted in accordance with the well drilling specifications and the requirements of this rule;

(iii) a copy of the aquifer drawdown test data, as a minimum, including the yield versus drawdown test data, as described in R309-515-6(10)(b) along with comments and interpretation by a licensed professional engineer or licensed professional geologist of the graphic drawdown information required by R309-515-6(10)(b)(vi)(E);

(iv) a copy of the chemical analyses required by R309-515-4(5);

(v) acceptable evidence that the water system owner has a legal right to divert water for the proposed use(s) from the well source(s);

(vi) a copy of complete plans and specifications prepared, signed, and stamped by a licensed professional engineer covering the well housing, equipment, and diversion piping necessary to introduce water from the well into the distribution system; and

(vii) a bacteriological analysis of water obtained from the well after installation of permanent equipment, disinfection, and flushing.

(d) An Operation Permit shall be obtained in accordance with R309-500-9 before any water from the well is introduced into a public water system.

(6) Well Materials, Design, and Construction.

(a) ANSI/NSF Standards 60 and 61 Certification.

All interior surfaces must consist of products complying with ANSI/NSF Standard 61. This requirement applies to drop pipes, well screens, coatings, adhesives, solders, fluxes, pumps, switches, electrical wire, sensors, and all other equipment or surfaces which may contact the drinking water.

All substances introduced into the well during construction or development shall be certified to comply with ANSI/NSF Standard 60. This requirement applies to drilling fluids (biocides, clay thinners, defoamers, foamers, loss circulation materials, lubricants, oxygen scavengers, viscosifiers, weighting agents) and regenerants.

(b) Permanent Steel Casing Pipe shall:

(i) be new single steel casing pipe meeting AWWA Standard A-100, ASTM or API specifications and having a minimum weight and thickness as given in Table 6 found in R655-4-11.2.3 of the Utah Administrative Code (Administrative Rules for Water Well Drillers, adopted April 11, 2011, Division of Water Rights);

(ii) have additional thickness and weight, if minimum thickness is not considered sufficient to assure reasonable life expectancy of the well;

(iii) be capable of withstanding forces to which it is subjected;

(iv) be equipped with a drive shoe when driven;

(v) have full circumferential welds or threaded coupling joints; and

(vi) project at least 18 inches above the anticipated final ground surface and at least 12 inches above the anticipated pump house floor level. At sites subject to flooding, the top of the well casing shall terminate at least three feet above the 100-year flood level or the highest known flood elevation, whichever is higher.

(c) Non-Ferrous Casing Material.

The use of any non-ferrous material for a well casing shall receive prior approval of the Director based on the ability of the material to perform its desired function. Thermoplastic water well casing pipe shall meet AWWA Standard A100-06 and shall bear the logo NSF-wc indicating compliance with NSF Standard 14 for use as well casing.

Guidance: Approval for non-ferrous well casing will be determined considering well depth, formations, temperatures, corrosion potential, well seal material, and other pertinent information.

(d) Disposal of Cuttings.

Cuttings and waste from well drilling operations shall not be discharged into a waterway, lake, or reservoir. The rules of the Utah Division of Water Quality must be observed with respect to these discharges.

(e) Packers.

Packers, if used, shall be of material that will not impart taste, odor, toxic substances, or bacterial contamination to the well water. Lead or partial lead packers are specifically prohibited.

(f) Screens.

The use of well screens is recommended where appropriate and, if used, they shall:

(i) be constructed of material resistant to damage by chemical action of groundwater or cleaning operations;

(ii) have size of openings based on sieve analysis of formations or gravel pack materials;

(iii) have sufficient diameter to provide adequate specific capacity and low aperture entrance velocities;

Guidance: Usually the entrance velocities should not exceed 0.1 fps.

(iv) be installed so that the operating water level remains above the screen under all pumping conditions; and,

(v) be provided with a bottom plate or wash-down bottom fitting of the same material as the screen.

(g) Plumbness and Alignment Requirements.

Every well shall be tested for plumbness and vertical alignment in accordance with AWWA Standard A100. Plans and specifications submitted for review shall:

(i) have the test method and allowable tolerances clearly stated in the specifications; and,

(ii) clearly indicate any options the design engineer may have if the well fails to meet the requirements. Generally, wells may be accepted if the misalignment does not interfere with the installation or operation of the pump or uniform placement of grout.

(h) Casing Perforations.

The placement of perforations in the well casing shall:

(i) be located, as far as practical, to permit the uniform collection of water around the circumference of the well casing; and,

(ii) be of dimensions and size to restrain the water bearing soils from entrance into the well.

(i) Well Sealing Techniques and Requirements.

For all public drinking water wells, the annulus between the outermost well casing and the borehole wall shall be sealed with grout to a depth of at least 100 feet below the ground surface unless an "exception" is issued by the Director (see R309-500-4(1)). If more than one casing is used, including a conductor casing, the annulus between the outermost casing and the next inner casing shall be sealed with grout (meeting the sealing materials requirements of R309-515-6(6)(i)(ii) herein) or with a water tight steel ring having a thickness equal to that of the permanent well casing and continuously welded to both casings. If a public drinking water well will be equipped with a pitless adapter or unit, a well seal shall be installed to a minimum depth of 110 feet to take into account the top 10 feet of compromised seal interval.

Guidance: This is required in order to prevent the seepage of undesirable surface or shallow ground water along the casing into the water bearing aquifer. The Division of Water Rights Administrative Rules for Water Wells Rule R655-4-11.7.5, Pitless Adapters/Units states, "A cement grout seal shall not be allowed within the pitless unit or pitless adapter sealing interval. The pitless adapter or unit sealing interval shall be sealed with unhydrated bentonite. The pitless adapter or unit, including the cap or cover, pitless case and other attachments, shall be designed and constructed to be watertight to prevent the entrance of contaminants into the well from surface or near-surface sources." Therefore, a cement seal shall not be used in the future pitless interval as a cement seal would need to be chipped and broken away from the casing when the pitless area is excavated and installed which could lead to casing damage. A bentonite seal must be used in the future pitless interval.

The following shall apply to all drinking water wells:

(i) Consideration During Well Construction.

(A) Sufficient annular opening shall be provided to permit a minimum of two inches of grout between the outermost permanent casing and the drilled hole, taking into consideration any joint couplings.

(B) The casing(s) must be placed to permit unobstructed flow and uniform thickness of grout.

Guidance: For the purpose of determining the dimension of the annular opening between the drilled hole and or any carrier casing or permanent casing which may be used, the nominal pipe dimension of casing or hole can be used. Centralizers, casing spacers, or welded guides are recommended to center the casing and to provide uniform grout thickness.

(ii) Sealing Materials.

(A) Neat Cement Grout.

Cement, conforming to ASTM Standard C150, and water, with no more than six gallons of water per sack of cement, shall be used for two-inch openings. Additives may be used to increase fluidity subject to approval by the Director.

(B) Concrete Grout.

Equal parts of cement conforming to ASTM Standard C150, and sand, with not more than six gallons of water per sack of cement, may be used for openings larger than two inches.

(C) Clay Seal.

Where an annular opening greater than six inches is available, a seal of swelling bentonite meeting the requirements of R655-4-11.4.2 may be used when approved by the Director.

(iii) Application.

(A) When the annular opening is less than four inches, grout shall be installed under pressure, by means of a positive displacement grout pump, from the bottom of the annular opening to be filled.

(B) When the annular opening is four or more inches and 100 feet or less in depth, and concrete grout is used, it may be placed by gravity

through a grout pipe installed to the bottom of the annular opening in one continuous operation until the annular opening is filled.

(C) All temporary construction casings shall be removed prior to or during the well sealing operation. Any exceptions shall be approved by the State Engineer's Office, and evidence of State Engineer's Office's approval shall be submitted to the Director (see R655-4-11.4.3.1 for conditions concerning leaving temporary surface casing in place). A temporary construction casing is a casing not intended to be part of the permanent well.

(D) When a "well in a protected aquifer" classification is desired, the grout seal shall extend from the ground surface down to at least 100 feet below the surface, and through the protective clay layer (see R309-600-6(1)(x)).

(E) After cement grouting is applied, work on the well shall be discontinued until the cement or concrete grout has properly set, usually a period of 72 hours.

Guidance: "Public Water Supply Well Grouting Requirements and Procedures" is available on the Division's website as additional information for grout placement.

(j) Water Entered Into Well During Construction.

Any water entering a well during construction shall not be contaminated and should be obtained from a chlorinated municipal system. Where this is not possible, the water must be treated to produce a 100 mg/l free chlorine residual in accordance with R655-4-11.6.5.

(k) Gravel Pack Wells.

The following shall apply to gravel packed wells:

(i) the gravel pack material shall be of well-rounded particles, at least 90 percent siliceous material, no more than five percent acid solubility, smooth and uniform, free of foreign material, properly sized, washed, and then disinfected immediately prior to or during placement;

(ii) the gravel pack shall be placed in one uniform continuous operation;

(iii) refill pipes, when used, shall be Schedule 40 steel pipe incorporated within the pump foundation and terminated with screwed or welded caps at least 12 inches above the pump house floor or concrete apron;

(iv) refill pipes located in the grouted annular opening shall be surrounded by a minimum of 1.5 inches of grout;

(v) protection shall be provided to prevent leakage of grout into the gravel pack or screen; and,

(vi) any casings not withdrawn entirely shall meet requirements of R309-515-6(6)(b) or R309-515-6(6)(c).

(7) Well Development.

(a) Every well shall be developed to remove the native silts and clays, drilling mud, or finer fraction of the gravel pack.

(b) Development should continue until the maximum specific capacity is obtained from the completed well.

(c) Where chemical conditioning is required, the specifications shall include provisions for the method, equipment, chemicals, testing for residual chemicals, and disposal of waste and inhibitors.

(d) Where blasting procedures may be used, the specifications shall include the provisions for blasting and cleaning. Special attention shall be given to assure that the grouting and casing are not damaged by the blasting.

(8) Capping Requirements.

(a) The well shall be securely capped in accordance with R655-4-14.1 until permanent equipment can be installed.

(b) At all times during the progress of work, the contractor shall provide protection to prevent tampering with the well or entrance of foreign materials.

Guidance: A welded metal plate or a threaded cap is the preferred method for capping a completed well until permanent equipment is installed.

(9) Well Abandonment.

(a) Test wells and groundwater sources, which will be permanently abandoned, shall be abandoned in accordance with R655-4-14.

(b) Wells to be abandoned shall be sealed to prevent undesirable exchange of water from one aquifer to another. Preference shall be given to using a neat cement grout. Where fill materials are used, which are other than cement grout or concrete, they shall be disinfected and free of foreign materials. When an abandoned well is filled with cement-grout or concrete, these materials shall be applied to the well- hole through a pipe, tremie, or bailer.

(10) Well Assessment.

(a) Step Drawdown Test.

Preliminary to the constant-rate test required below, it is recommended that a step-drawdown test (uniform increases in pumping rates over uniform time intervals with single drawdown measurements taken at the end of the intervals) be conducted to determine the maximum pumping rate for the desired intake setting.

(b) Constant-Rate Test.

A "constant-rate" yield and drawdown test shall:

(i) be performed on every production well after well development and prior to placement of the permanent pump;

(ii) have the test methods clearly indicated in the specifications;

(iii) have a test pump with sufficient capacity that when pumped against the maximum anticipated drawdown, it will be capable of pumping in excess of the desired design discharge rate;

(iv) provide for continuous pumping for at least 24 hours or until stabilized drawdown has continued for at least six hours when test pumped at a "constant-rate" equal to the desired design discharge rate,

(v) provide the following data:

(A) capacity vs. head characteristics for the test pump (manufacturer's pump curve);

(B) static water level (in feet to the nearest tenth, as measured from an identified datum; usually the top of casing);

(C) depth of test pump intake; and,

(D) time and date of starting and ending test(s);

Guidance: It is recommended to monitor any existing wells in the area during the pump test to perform a more useful aquifer test and determine if there will be interference from other wells.

(vi) For the "constant-rate" test, provide the following at time intervals sufficient for at least ten essentially uniform intervals for each log cycle of the graphic evaluation required below:

(A) record the time since starting test (in minutes);

(B) record the actual pumping rate;

(C) record the pumping water level (in feet to the nearest tenth, as measured from the same datum used for the static water level;

(D) record the drawdown (pumping water level minus static water level in feet to the nearest tenth);

(E) provide graphic evaluation on semi-logarithmic graph paper by plotting the drawdown measurements on the arithmetic scale at locations corresponding to time since starting test on the logarithmic scale; and,

(vii) Immediately after termination of the constant-rate test, and for a period of time until there are no changes in depth to water level measurements for at least six hours, record the following at time intervals similar to those used during the constant-rate pump test:

(A) time since stopping pump test (in minutes),

(B) depth to water level (in feet to the nearest tenth, as measured from the same datum used for the pumping water level).

(c) Safe Yield.

If the aquifer drawdown test data shows that the drawdown has stabilized, the Director will consider 2/3 of the pumping rate used in the constant-rate test as the safe yield to determine the number of permanent residential connections or ERCs that a well source can support.

(11) Well Disinfection.

Every new, modified, or reconditioned well including pumping equipment shall be disinfected before being placed into service for drinking water use. These shall be disinfected according to AWWA Standards C654-03 and A100-06 as modified to incorporate the following as a minimum standard:

(i) the well shall be disinfected with a chlorine solution of sufficient volume and strength and so applied that a concentration of at least 50 parts per million is obtained in all parts of the well and the equipment installed in the well. This solution shall remain in the well for a period of at least eight hours; and,

(ii) a satisfactory bacteriologic water sample analysis shall be obtained prior to the use of water from the well in a public water system.

(12) Well Equipping.

(a) Naturally Flowing Wells.

Naturally flowing wells shall:

(i) have the discharge controlled by valves;

(ii) be provided with permanent casing and sealed by grout; and,

(iii) if erosion of the confining bed adjacent to the well appears likely, special protective construction may be required by the Director.

(b) Well Pumps.

(i) The design discharge rate of the well pump shall not exceed the rate used during the constant-rate aquifer drawdown test.

(ii) Wells equipped with line shaft pumps shall:

(A) have the casing firmly connected to the pump structure or have the casing inserted into the recess extending at least 0.5 inches into the pump base;

(B) have the pump foundation and base designed to prevent fluids from coming into contact with joints between the pump base and the casing;

(C) be designed such that the intake of the well pump is at least ten feet below the maximum anticipated drawdown elevation; and,

(D) avoid the use of oil lubrication for pumps with intake screens set at depths less than 400 feet (see R309-105-10(7) and/or R309-515-8(2)for additional requirements of lubricants).

(iii) Where a submersible pump is used:

(A) the top of the casing shall be effectively sealed against the entrance of water under all conditions of vibration or movement of conductors or cables;

(B) the electrical cable shall be firmly attached to the riser pipe at 20-foot intervals or less; and,

(C) the intake of the well pump must be at least ten feet below the maximum anticipated drawdown elevation.

(c) Pitless Well Units and Adapters.

If the excavation surrounding the well casing allowing installation of the pitless unit compromises the surface seal, the competency of the surface seal shall be restored. Torch-cut holes in the well casing shall be to neat lines closely following the outline of the pitless adapter and completely filled with a competent weld with burrs and fins removed prior to the installation of the pitless unit and adapter.

Pitless well units and adapters shall:

(i) be used to make a connection to a water well casing that is made below the ground. A below-the-ground connection shall not be submerged in water during installation;

(ii) terminate at least 18 inches above final ground elevation or three feet above the highest known flood elevation, whichever is greater;

(iii) contain a label or have a certification indicating compliance with the Water Systems Council Pitless Adapter Standard (PAS-97);

(iv) have suitable access to the interior of the casing in order to disinfect the well;

(v) have a suitable sanitary seal or cover at the upper terminal of the casing that will prevent the entrance of any fluids or contamination, especially at the connection point of the electrical cables;

(vi) have suitable access so that measurements of static and pumped water levels in the well can be obtained;

(vii) allow at least one check valve within the well casing;

(viii) be furnished with a cover that is lockable or otherwise protected against vandalism or sabotage;

(ix) be shop-fabricated from the point of connection with the well casing to the unit cap or cover;

(x) be of watertight construction throughout;

(xi) be constructed of materials at least equivalent to and having wall thickness compatible to the casing;

(xii) have field connection to the lateral discharge from the pitless unit of threaded, flanged, or mechanical joint connection;

(xiii) be threaded or welded to the well casing. If the connection to the casing is by field weld, the shop-assembled unit must be designed specifically for field welding to the casing. The only field welding permitted on the pitless unit is to connect the pitless unit to the casing; and,

(xiv) have an inside diameter as great as that of the well casing, up to and including casing diameters of 12 inches, to facilitate work and repair on the well, pump, or well screen.

(d) Well Discharge Piping.

The discharge piping shall:

(i) be designed so that the friction loss will be low;

(ii) have control valves and appurtenances located above the pump house floor when an above-ground discharge is provided;

(iii) be protected against the entrance of contamination;

(iv) be equipped with a smooth-nosed sampling tap, a check valve, a pressure gauge, a means of measuring flow, and a shutoff valve (with the smooth-nosed sampling tap being the first item from the well head and the shut-off valve as the last item), unless it is a naturally flowing well which may need an alternative design;

(v) where a well pumps directly into a distribution system, be equipped with an air release vacuum relief valve located upstream from the check valve, with exhaust/relief piping terminating in a down-turned position at least six inches above the well house floor and covered with a No. 14 mesh corrosion resistant

screen. An air release vacuum relief valve is not required if the specific proposed well head valve and piping design includes provisions for pumping to waste all trapped air before water is introduced into the distribution system;

(vi) have all exposed piping valves and appurtenances protected against physical damage and freezing;

(vii) be properly anchored to prevent movement;

(viii) be properly protected against surge or water hammer; and,

(ix) if a pump to waste line exists, it shall not be connected to a sewer/storm drain without a minimum 12-inch clearance to the flood rim, and the discharge end of the pump-to-waste line shall be downturned and covered with a No. 4 mesh corrosion resistant screen (refer to R309-545-10(1)).

Guidance: It is recommended that discharge piping be provided with a means of pumping to waste. All pump-to-waste discharge lines should be designed for complete drainage to minimize freezing and unprotected cross connection problems.

Guidance: Provisions should be made for venting the well casing to atmosphere, particularly if a large or sudden water drawdown is expected. The vent shall terminate in a down turned position, at or above the top of the casing or pitless unit in a minimum 1.5 inch diameter opening covered with a No. 14 mesh, corrosion resistant screen (refer to section R309-545-15). The pipe connecting the casing to the vent shall be of adequate size to provide rapid venting of the casing.

(e) Water Level Measurement.

(i) Provisions shall be made to permit periodic measurement of water levels in the completed well.

(ii) Where permanent water level measuring equipment is installed, it shall be made using corrosion resistant materials attached firmly to the drop pipe or pump column and installed to prevent entrance of foreign materials.

(f) Observation Wells.

Observation wells shall be:

(i) constructed in accordance with the requirements for permanent wells if they are to remain in service after completion of a water supply well; and,

(ii) protected at the upper terminal to preclude entrance of foreign materials.

(g) Electrical Protection.

Sufficient electrical controls shall be placed on all pump motors to eliminate electrical problems due to phase shifts, surges, lightning, etc.

(13) Well House Construction.

The use of a well house is strongly recommended, particularly in installations utilizing above ground motors.

In addition to applicable provisions of R309-540, well pump houses shall conform to the following:

(a) Casing Projection Above Floor.

The permanent casing for all ground water wells shall project at least 12 inches above the pump house floor or concrete apron surface and at least 18 inches above the final ground surface. However, casings terminated in underground vaults may be permitted if the vault is provided with a “drain-to-daylight” sized to handle in excess of the well flow and surface runoff is directed away from the vault access.

(b) Floor Drain.

Where a well house is constructed, the floor surface shall be at least six inches above the final ground elevation and shall be sloped to provide drainage. A "drain-to-daylight" shall be provided unless highly impractical.

(c) Earth Berm.

Sites subject to flooding shall be provided with an earth berm terminating at an elevation at least two feet above the highest known flood elevation or other suitable protection as determined by the Director.

(d) Well Casing Termination at Flood Sites.

The top of the well casing at sites subject to flooding shall terminate at least three feet above the 100-year flood level or the highest known flood elevation, whichever is higher (refer to R309-515-6(6)(b)(vi)).

(e) Miscellaneous.

The well house shall be ventilated, heated, and lighted in such a manner as to assure adequate protection of the equipment (refer to R309-540-5(2) (a) through (h)).

(f) Fencing.

Where necessary to protect the quality of the well water, the Director may require that certain wells be fenced in a manner similar to fencing required around spring areas.

(g) Access.

An access shall be provided either through the well house roof or sidewalls in the event the pump must be pulled for replacement or servicing the well.

R309-515-7. Ground Water - Springs.

(1) General.

Springs vary greatly in their characteristics and they should be observed for some time prior to development to determine any flow and quality variations. Springs determined to be under the direct influence of surface water shall comply with surface water treatment requirements.

(2) Source Protection.

Public drinking water systems are responsible for protecting their spring sources from contamination. The selection of a spring shall only be made after consideration of the requirements of R309-515-4. Springs must be located in an area that shall minimize threats from existing or potential sources of pollution. A Preliminary Evaluation Report on source protection issues is required by R309-600-13(2). If certain precautions are taken, sewer lines may be permitted within a public drinking water system's source protection zones at the discretion of the Director. When sewer lines are permitted in protection zones both sewer lines and manholes shall be specially constructed as described in R309-515-6(4).

(3) Surface Water Influence.

Some springs yield water that has been filtered underground for years; other springs yield water that has been filtered underground only a matter of hours. Even with proper development, the untreated water from certain springs may exhibit turbidity and high coliform counts. This indicates that the spring water is not being sufficiently filtered in underground travel. If a spring is determined to be under the direct influence of surface

water, it shall be treated to meet the surface water treatment requirements specified in R309-505-6.

(4) Pre-construction Submittal

Before beginning spring development construction, the following information shall be submitted to the Director and approved in writing:

(a) detailed plans and specifications covering the development work;

(b) if available, a copy of an engineer's or geologist's statement indicating:

(i) the historical record of spring flow variation;

(ii) expected minimum flow and the time of year it will occur;

(iii) expected maximum flow and the time of year it will occur;

(iv) expected average flow; and,

(v) the behavior of the spring during drought conditions;

(c) acceptable evidence that the water system has a legal right to divert water for the proposed use(s) from the spring source(s);

(d) a Preliminary Evaluation Report on source protection issues as required by R309-600-13;

Guidance: The public water system management and the design engineer should refer to R309-505-7(1) before considering a spring as a source for a public water system.

(e) a copy of the chemical analyses required by R309-515-4(5); and,

(f) an assessment of whether the spring is under the direct influence of surface water (refer to R309-505-7(1)(a)).

Guidance: This assessment can be based on site inspection, known geological conditions, or specific water analysis, such as Microscopic Particulate Analysis (MPA) and chemical analysis.

(5) Information Required after Spring Development.

After development of a spring as a drinking water source, the following information shall be submitted to the Director for review.

(a) proof of satisfactory bacteriologic quality ;

(b) information on the rate of flow developed from the spring.

Immediately after spring development, the water system shall collect monthly spring flow data during operating seasons when the spring is reasonably accessible, as a minimum, for three years, and submit spring flow data to the Director for determination of spring yield. After evaluating the spring flow information including seasonal and annual variations, the Director will determine a spring yield, which will be used in assessing the number of and type of connections that can be served by the spring. The spring yield typically is set at the 25th percentile of the spring flow data. If the spring exhibits significant seasonal or annual variations, the spring yield may be assessed on a case-by-case basis.

(c) Record drawings of spring development.

(6) Operating Permit Required.

Water from the spring can be introduced into a public water system only after it has been approved for use, in writing, as evidenced by the issuance of an Operating Permit by the Director (see R309-500-9).

(7) Spring Development.

The development of springs for drinking water purposes shall comply with the following requirements.

(a) The spring collection device, whether it be collection tile, perforated pipe, imported gravel, infiltration boxes, or tunnels must be covered with a minimum of 10 feet of relatively impervious soil cover. Such cover must extend a minimum of 15 feet in all horizontal directions from the spring collection device. Clean, inert, non-organic material shall be placed in the vicinity of the collection device(s).

(b) Where it is impossible to achieve the 10 feet of relatively impervious soil cover, an acceptable alternate will be the use of an impermeable liner provided that:

(i) the liner has a minimum thickness of at least 40 mils;

(ii) all seams in the liner are folded or welded to prevent leakage;

(iii) the liner is certified as complying with ANSI/NSF Standard 61. This requirement is waived if certain that the drinking water will not contact the liner;

(iv) the liner is installed in such a manner as to assure its integrity. No stones, two inch or larger or sharp edged, shall be located within two inches of the liner;

(v) a minimum of two feet of relatively impervious soil cover is placed over the impermeable liner; and,

(vi) the soil and liner cover are extended a minimum of 15 feet in all horizontal directions from the collection devices.

(c) Each spring collection area shall be provided with at least one collection box to permit spring inspection and testing.

(d) All junction boxes and collection boxes, must comply with R309-545 with respect to access openings, venting, and tank overflow. Lids for these spring boxes shall be gasketed and the box adequately vented.

(e) The spring collection area shall be surrounded by a fence located a distance of 50 feet (preferably 100 feet if conditions allow) from all collection devices on land at an elevation equal to or higher than the collection device, and a distance of 15 feet from all collection devices on land at an elevation lower than the collection device. The elevation datum to be used is the surface elevation at the point of collection. The fence shall be at least "stock tight" (see R309-110). In remote areas where no grazing or public access is possible, an exception to the fencing requirement may be granted by the Director. In populated areas, a six-foot high chain link fence with three strands of barbed wire may be required.

(f) Within the fenced area all vegetation having deep roots shall be removed by a means not negatively affecting water quality.

(g) A diversion channel, or berm, capable of diverting all anticipated surface water runoff away from the spring collection area shall be constructed immediately inside the fenced area.

(h) A permanent flow-measuring device shall be installed. Flow measurement devices such as critical depth meters or weirs shall be properly housed and otherwise protected.

(i) The spring shall be developed as thoroughly as possible to minimize the possibility of excess spring water ponding within the collection area. Where the ponding of spring water is unavoidable, the excess shall be collected by shallow

piping or french drain, and be routed beyond and down grade of the fenced area required above, whether or not a fence is in place.

R309-515-8. Operation and Maintenance.

(1) Spring Collection Area Maintenance.

(a) Spring collection areas shall be periodically (preferably annually) cleared of deep-rooted vegetation to prevent root growth from clogging collection lines. Frequent hand or mechanical clearing of spring collection areas and diversion channel is strongly recommended. It is advantageous to encourage the growth of grasses and other shallow rooted vegetation for erosion control and to inhibit the growth of more detrimental flora.

(b) No pesticide (e.g., herbicide) may be applied on a spring collection area without the prior written approval of the Director. Such approval can be granted only when:

(i) acceptable pesticides are proposed;

(ii) the pesticide product manufacturer certifies that no harmful substance will be imparted to the water; and,

(iii) spring development construction meets the requirements of these rules.

(2) Pump Lubricants.

The U.S. Food and Drug Administration (FDA) has approved propylene glycol and certain types of mineral oil for occasional contact with or for addition to food products. These oils are commonly referred to as "food-grade mineral oils". All oil lubricated pumps shall utilize food grade mineral oil suitable for human consumption as determined by the Director.

(3) Algicide Treatment.

No algicide shall be applied to a drinking water source unless specific approval is obtained from the Director. Such approval will be given only if the algicide is certified as meeting the requirements of ANSI/NSF Standard 60, Water Treatment Chemicals - Health Effects.

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R309-520. Facility Design and Operation: Disinfection

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R309-520. Facility Design and Operation: Disinfection.

R309-520-1. Purpose.

This rule specifies requirements for facilities that disinfect public drinking water. It is to be applied in conjunction with Rule Series 500, Drinking Water Facility Construction, Design, and Operation, namely, R309-500 through R309-550. Collectively, these Rules govern the design, construction, and operation and maintenance of public drinking water system facilities. These Rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water that consistently meet applicable drinking water quality requirements and do no harm to general public health.

R309-520-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-520-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-520-4. Primary Disinfectants.

Primary disinfection is the means to provide adequate levels of inactivation of pathogenic micro organisms within the treatment process. The effectiveness of chemical disinfectants is measured as a function of the concentration and time of contact, a "CT" value in units such as mg/L-min. The effectiveness of UV disinfection is determined through validation testing of each model and specific configuration of UV reactor proposed in the design, as described in R309-520-8.

Only four disinfectants: chlorine (i.e., gas, hypochlorite solution, and hypochlorite tablets), ozone, ultraviolet light, and chlorine dioxide are approved herein as allowable primary disinfectants of drinking water.

Guidance: Iodine disinfection is no longer allowed because of adverse health implications for the public.

R309-520-5. Secondary Disinfectants.

Secondary disinfection is the means to provide an adequate disinfectant residual in the distribution system to maintain a chemical barrier and to control bacteriological quality of treated water.

The effectiveness of secondary chemical disinfection is measured through maintaining a detectable disinfectant residual throughout the distribution system. Allowable secondary disinfectants are chlorine (gas, hypochlorite solution, and hypochlorite tablets) and chloramine.

R309-520-6. General.

(1) Continuous Disinfection

Continuous disinfection is required of all ground water sources that do not otherwise continuously meet standards of bacteriologic quality. Intermittent or batch disinfection, commonly used for disinfecting new water tanks, waterlines, well casings, etc., is not acceptable for ongoing drinking water delivery service. Surface water sources, and ground water sources under direct influence (UDI) of surface water, shall be disinfected as a part of the treatment requirements for conventional surface water treatment or alternative surface water treatment.

Disinfection is not an acceptable remedy to inadequate drinking water system facilities. Systems that practice source disinfection, and whose sources are exclusively ground water sources, as defined in R309-505-8, shall meet the requirements of R309-105-10(1), Chemical Addition.

Guidance: Temporary disinfection of a water source newly discovered as failing bacteriological water sampling result standards may be prudent public health policy. However, permanent disinfection is not regarded as a satisfactory resolution of the situation. That is, disinfection cannot be used to simply mask ongoing bacteriological contamination of a water source. The root cause of the failed bacteriological water quality at the source must be rectified.

(2) ANSI/NSF Standard 60 Certification

All chemicals, including chlorine (i.e., gas, hypochlorite solution, hypochlorite tablets, granules, and powder), chloramines, and chemicals used to generate chlorine dioxide, added to drinking water supplied by a public water system shall be certified as complying with ANSI/NSF Standard 60, Drinking Water Treatment Chemicals.

Guidance: Hypochlorite tablets for swimming pools are not approved for drinking water. The swimming pool grade hypochlorite tablets contain additional chemicals, intended to retard the photodecomposition of hypochlorite in swimming pools, and typically lack approval for use in drinking water. Sodium chloride (NaCl) used for on-site hypochlorite generation, as well as water softener resin regeneration, shall be certified as complying with ANSI/NSF Standard 60, Drinking Water Treatment Chemicals. Ammonia gas (often termed agricultural ammonia) used in the ammonification process for on-site choramine disinfectant generation shall be certified as complying with ANSI/NSF Standard 60, Drinking Water Treatment Chemicals.

(3) Appropriate Use of Primary and Secondary Disinfectants

Surface water, or groundwater under the direct influence of surface water, shall be filtered and disinfected.

Only ground water not under the influence of surface water can be adequately disinfected with primary disinfectants, or primary and secondary disinfectants, alone. Surface waters, as well as ground water under the direct influence of surface water, require conventional surface water treatment or alternative surface water treatment methods.

(4) Required Disinfectant Dose and Contact Time

Minimum cyst and virus reductions for that approved primary chemical disinfectants must achieve are specified in R309-200-5(7)(a), Disinfection, and reiterated in R309-200-7(2), namely 4-log virus removal or inactivation, 3-log Giardia lamblia cyst removal or inactivation, and 2-log Cryptosporidium removal or inactivation for water sources in bin 1 classification per R309-215-15(11)(c). Minimum doses and contact times for primary chemical disinfectants are standardized as “CT” values as defined in R309-110-4, Definitions.

(5) Site Selection

Disinfection installations shall be sited to permit convenient year-round access. These installations shall initially be sited with due consideration of possible danger to nearby population and of possible jeopardy from seismic fault zones.

Guidance: Public water systems shall work closely with local fire suppression authorities to evaluate public hazards associated with on-site use of chorine gas, especially, when subdivisions or other populations newly encroach upon previously remote facilities or when new geologic hazards are identified.

R309-520-7. Chlorine.

(1) General Requirements for all Chlorination Installations.

(a) Chemical Types.

Disinfection by chlorination shall be accomplished by gaseous chlorine or liquid solutions of calcium hypochlorite or sodium hypochlorite.

(b) Feed Equipment.

Solution-feed gas type chlorinators, direct-feed gas type chlorinators or hypochlorite liquid feeders of a positive displacement type shall be provided. Solution-feed gas type chlorinators are preferred. However, for small supplies requiring less than four pounds per day, liquid hypochlorite feed systems are advised.

(c) Chlorine Feed Capacity.

The design of each chlorinator shall permit:

(i) the chlorinator capacity to be such that a free chlorine residual of at least 2 mg/l can be maintained in the system after 30 minutes of contact time during peak demand. The equipment shall be of such design that it will operate accurately over a feeding range of 0.2 mg/l to 2 mg/l.

(ii) assurance that a detectable residual, either combined or free, can be maintained at all times, at all points within the intended area in the distribution system.

(d) Automatic Proportioning.

Automatic proportioning chlorinators shall be required where the rate of flow of the water to be treated or chlorine demand of the water to be treated is not reasonably constant.

Guidance: Chlorine gas chlorinators that respond to a 4-20 milliamp signal from an electronic flow meter are recommended for flow-proportioning. Chlorine gas chlorinators that respond to on-line chlorine residual concentration feedback signal are recommended for dose-proportioning.

(e) Injector/diffuser.

(i) Location. The chlorine solution injector/diffuser shall be compatible with the point of application to provide a rapid and thorough mix with all the water being treated. The center of a pipeline is the preferred application point.

(ii) Equipment. Each injector selected shall be appropriate to the intended point of application with particular attention given to the quantity of chlorine to be added, the maximum injector water flow, the back pressure of the to-be-treated water flow, the injector operating pressure, and the size of the chlorine solution line. Gauges for measuring water pressure at the inlet and outlet of each injector shall be provided.
(iii) Protection. A suitable screen to prevent small debris from clogging a chlorine injector shall be provided on each water feed line. Provision for flushing of the screen is required.

(f) Contact Time and Point of Application.

(i) Due consideration shall be given to the contact time of the chlorine in water with relation to pH, ammonia, taste producing substances, temperature, biological quality, and other pertinent factors.

(ii) Where possible, the design shall minimize the formation of chloro-organic compounds. At plants treating surface water or ground water under the direct influence of surface water, provisions shall be made for applying chlorine to raw water, applied water, filtered water, and water entering the distribution system.

(iii) When treating ground water, provisions shall be made for applying chlorine to at least a reservoir inlet or transmission pipeline which will provide sufficient contact time.

(iv) Care must be taken to assure that the point of application will, in conjunction with the pipe and tank configuration of the water system, allow required CT values to be achieved prior to the first consumer connection.

(g) Minimization of Chlorinated Overflow.

The chlorinator and associated water delivery facilities shall be designed so as to minimize the release of chlorinated water into the environment, for example, discharge chlorinated water from tank overflows. Such release must comply with rules of Division of Water Quality that pertains to discharge or pollution.

(h) Feed Water Piping.

The chlorinator water supply piping shall be designed to prevent contamination of the treated water supply by make-up water of lesser quality. At all facilities treating surface water, pre-chlorination and post-chlorination systems shall be independent where pre-chlorination chlorine solution make-up water is not finished water. All chlorine solution make-up water shall be at least of equal quality to the water receiving the chlorine solution.

(i) Flow Measurement.

The chlorination system design shall have a means to measure the flow rate of treated water, which is critical to operation of flow-proportioned disinfectant dosing.

Guidance: In most circumstances, a commercial flow meter will be necessary to satisfy this requirement. In unusual circumstances, for example, where the availability of electrical power may be problematic, an exception-to-rule may be warranted to allow the use of a calibrated staff gauge or a calibrated v-notch weir, in an appropriate hydraulic structure such as a surface water intake box or a spring collection box outlet wall.

(j) Residual Testing Equipment.

Chlorine residual test equipment, in accordance with the analytical methods in "Standard Methods for the Examination of Water and Wastewater," shall be provided and shall be capable of measuring residuals to the nearest 0.1 mg/l in the range below 0.5 mg/l, to the nearest 0.3 mg/l between 0.5 mg/l and 1.0 mg/l and to the nearest 0.5 mg/l above 1.0 mg/l.

Guidance: Automatic chlorine residual recorders shall be provided where the chlorine demand varies appreciably over a short period of time. The N,N-Diethyl-p-phenylendiamine (DPD) method of chlorine residual determination is recommended.

(k) Standby and Backup Equipment.

A spare parts kit shall be provided and maintained for all chlorinators to repair parts subject to wear and breakage. If there could be a large difference in feed rates between routine and emergency dosages, multiple gas metering tubes shall be provided, at least one for each dose range, to assure accurate control of the chlorine feed under both routine and emergency conditions. Where chlorination is required for disinfection of a water supply, standby equipment of sufficient capacity shall be available to replace the largest unit in the event of its failure. Standby power shall be available, during power outages, for operation of chlorinators where disinfection of the water supply is required.

(l) Heating, Lighting, Ventilation.

Chlorinator houses shall be heated, lighted and ventilated as necessary to assure proper operation of the equipment and to facilitate its serviceability.

(m) Bypass-to-Waste Capability of Chlorine Disinfection Systems.

A chlorinator bypass, with appropriate turn-out of un-chlorinated water, shall be provided to allow the flow to waste for periods when the chlorination system is not operational. This is necessary to prevent un-chlorinated water from entering the distribution system. The flow to waste shall be designed such that it does not result in unintended consequences such as flooding or property damage.

(n) Isolation Capability.

Chlorinator isolation plumbing shall be provided such that each chlorinator can be removed from the process train (e.g., during maintenance, power outage, other shutdown, etc.) without allowing otherwise unchlorinated water to bypass the unit and be delivered to the public for consumption.

(2) Additional Requirement for Gas Chlorinators.

(a) Automatic Switch over.

Automatic Switch over of chlorine cylinders shall be provided, where necessary, to assure continuous disinfection.

(b) Injector and Eductor.

Each injector or eductor shall be selected for the point of application with particular attention given to the quantity of chlorine to be added, the maximum injector or eductor water flow, the total discharge back pressure, the injector operating pressure, and the size of the chlorine solution line. Gauges for measuring water pressure at the inlet and outlet of each injector shall be provided.

(c) Gas Scrubbers.

Gas chlorine facilities shall conform with the Uniform Fire Code, Article 80 and the Uniform Building Code, Chapter 9 as they are applied by local jurisdictions in the state. Furthermore, local toxic gas ordinances shall be complied with if they exist.

(d) Heat.

The design of the chlorination room shall assure that the temperature in the room will never fall below 32 degrees F or that temperature required for proper operation of the chlorinator, whichever is greater.

Guidance: Chlorinator rooms shall be heated to 50 degrees F, and be protected from room temperatures in excess of 70-80 degrees F. Where space heaters are used, the cylinders shall be protected from direct heat. Care must be taken to avoid chlorine condensation in feed lines caused by the feed equipment being cooler than the chlorine cylinder.

(e) Ventilation.

Chlorination equipment rooms which contain chlorine cylinders, tanks, equipment and gaseous chlorine lines under pressure shall have at least one exhaust fan and shall be constructed and equipped such that:

Guidance: For the safety of the operators, chlorination facility shall not be located in a vault that has inadequate ventilation or in a location that is considered a confined space.

(i) chlorine room exhaust fan(s), when operating, shall provide at least one complete room air change per minute;

(ii) chlorine room ventilating fan(s) shall take suction inside the chlorine room near the floor, as far as practical from the door and air inlet, and exhaust air out of the room with the point of discharge so located as not to contaminate air inlets of any other rooms or any structures;

(iii) chlorine room air entryways shall be through wall louvers near the ceiling;

(iv) chlorine room air entryway louvers and air exit-way louvers (e.g., on outside faceplate of any floor level exhaust fan) shall have air-tight closure;

(iv) separate switches for the chlorine room fans and lights shall be outside of the chlorine room near the entrance to the room, and shall be protected from vandalism; and

Guidance: For chlorinators which lack proper security, switches may be located just inside the door. A signal light indicating fan operation shall be provided at each entrance when the fan can be controlled from more than one point.

(v) vents from feeders and storage discharge above grade to the outside atmosphere.

(f) Feeder Vent Line.

The vent hose from the feeder shall discharge to the outside atmosphere above grade at a point least susceptible to vandalism and shall have the end covered with a No. 14 mesh non-corrodible screen.

(g) Housing.

Adequate housing shall be provided for the chlorination equipment and for storing the chlorine (see R309-520-10(1)(l) above).

(h) Housing at Water Treatment Plants.

A separate room, referred to as the chlorine room, for chlorine cylinders and feed equipment, shall be provided at all water treatment plants. Chlorine gas feed and storage shall be enclosed in the chlorine room and separated from other operating areas. The chlorine room shall have:

(i) shatter resistant inspection window(s) installed in an interior wall and preferably located so that an operator may read the weighing scales without entering the chlorine room,

(ii) construction such that all openings between the chlorine room and the remainder of the plant are sealed, and

(iii) outward-opening doors equipped with panic bars to facilitate a means of easy and rapid exit to the building exterior.

(iv) floor drains shall be discouraged but, where provided, these floor drains shall discharge to the outside of the building and shall not be connected to other internal or external drain systems.

Guidance: The room location shall be on the prevailing downwind side of the building away from entrances, windows, louvers, walkways, etc.

(i) Cylinder Security.

Full and empty cylinders of liquefied chlorine gas and ammonia gas shall be stored in rooms separate from each other, and shall be:

(i) isolated from operating areas;

(ii) restrained in position to prevent upset from accidental bumping, seismic event or other such circumstance;

(iii) stored in areas not in direct sunlight or not exposed to excessive heat.

(j) Feed Line Routing.

Chlorine feed lines shall not carry pressurized chlorine gas beyond the chlorinator room. Only vacuum lines may be routed to other portions of the building outside the chlorine room. Any openings for these lines must be adequately sealed.

(k) Weighing Scales.

Scales shall be provided for determining chlorine cylinder weight. Scales shall be of a corrosion resistant material and shall be placed in a location remote from any moisture. Scales shall be accurate enough to indicate loss of weight to the nearest one pound for 150 pound cylinders and to the nearest 10 pounds for one ton cylinders.

(l) Pressure Gauges.

Pressure gauges shall be provided on the inlet and outlet of each chlorine injector. Water pressures at the inlet and outlet of each chlorine injector shall be accurately measured. The preferred location is on the water feed line immediately before the inlet of the chlorine injector and at a point on the water main just ahead of chlorine injection. These locations shall give accurate pressure readings while not being subjected to corrosive chlorinated water.

Guidance: In lieu of gauges located directly at risk of corrosion in the chlorinated solution, the inlet pressure may be gauged on the injector make-up waterline immediately ahead of chlorine entrainment and the outlet pressure may be gauged in the treated water flow immediately upstream of the injectors

before the flow has been dosed with the corrosive hypochlorite solution (i.e., said measured pressure is assumed to be equivalent to the pressure immediately downstream of the injector).

(m) Injector Protection.

A suitable screen to prevent small debris from clogging a chlorine injector shall be provided on the water feed line. Provision for flushing of the screen is required.

(n) Chlorine Vent Line Protection.

A non-corrodible fine mesh (No. 14 or finer) screen shall be placed over the discharge ends of all vent lines. All vent lines shall discharge to the outside atmosphere above grade and at locations least susceptible to vandalism.

(o) Gas Masks.

(i) Respiratory protection equipment, meeting the requirements of the National Institute for Occupational Safety and Health (NIOSH) shall be available where chlorine gas in one-ton cylinders is handled, and shall be stored at a convenient location, but not inside any room where chlorine is used or stored. The units shall use compressed air, have at least a 30 minute capacity, and be compatible with units used by the fire department responsible for the plant.

(ii) Where smaller chlorine cylinders are used, suitable gas masks must be provided.

(p) Chlorine Leak Detection and Repair.

A bottle of Ammonium Hydroxide, 56% ammonia solution, shall be available for chlorine leak detection; where ton containers are used, a leak repair kit approved by the Chlorine Institute shall be provided. Continuous chlorine leak detection equipment is recommended. Where a leak detector is provided, it shall be equipped with both an audible alarm and a warning light.

(3) Additional Requirement for Hypochlorite Systems.

Disinfection by free chlorine shall be accomplished with stock hypochlorite solutions, hypochlorite solution produced by an on-site generator, or hypochlorite solutions prepared from hypochlorite tablets.

Guidance: Non-NSF-certified, over-the-counter household bleach is not approved for "normal" use in drinking water principally because of contaminant trace metals in these products.

(a) Concentrated Sodium Hypochlorite Solutions.

(i) The concentrated sodium hypochlorite solutions used for drinking water treatment shall be certified as meeting the ANSI/NSF Standard 60.

(ii) Emergency eyewash stations or showers shall be provided at all hypochlorite installations where concentrated (e.g., above 5.25% strength) hypochlorite solutions are handled for dilution by operators or other personnel.

Guidance: Where concentrated solutions of hypochlorite are used directly for water treatment (e.g., many small systems take suction for a diaphragm chemical feeder pump directly from carboys of concentrated hypochlorite solution), only eye wash devices are required although deluge showers are recommended.

(iii) The storage and injection areas shall be designed to minimize the decay of the strength of the concentrated hypochlorite solution over time, such as minimize excessive heat or direct sunlight.

Guidance: The strength of the concentrated hypochlorite solution decreases over time, especially during unfavorable temperature conditions. This affects the dosage needed to achieve effective disinfection. The operator shall keep records of the delivery date of the stock solution, and avoid direct sunlight or heat in the stock solution storage area.

(b) On-Site Hypochlorite Solutions Generation.

The on-site hypochlorite generation systems used for drinking water treatment shall be certified as meeting the NSF/ANSI Standard 61. Manufacturer recommendations for safety with respect to equipment electrical power and other considerations for the ANSI/NSF Standard 61 certified on-site chlorine generation system shall be followed.

Guidance: The on-site generation systems typically produce dilute (e.g. 0.8% as Cl_2) solutions of sodium hypochlorite. They generally consist of (i) a potable water supply, (ii) ion exchange cartridges or cylinders for water supply water softening, (iii) a granular sodium chloride vat for passive dissolution of sodium chloride into a saturated sodium chloride brine, (iv) a transfer pump at the vat to deliver concentrated sodium chloride brine to the electrolytic chlorine generation unit, and (v) on-site storage vessels for the dilute hypochlorite solution from the electrolytic chlorine generation unit. The electrolytic cell in on-site chlorine generation systems typically has considerable power input which may pose peculiar operator hazards.

(c) Calcium Hypochlorite.

(i) The calcium hypochlorite tablets, granules, and powder forms, used for drinking water treatment shall be certified as meeting ANSI/NSF Standard 60.

Guidance: The calcium hypochlorite systems typically consist of an eroder chamber that is filled with tablets with once-through or recirculating dissolution water, and a below-unit holding tank for the resultant dilute (e.g., 0.1%, as Cl_2) solution of calcium hypochlorite tablets.

(ii) The calcium hypochlorite dissolution systems for drinking water treatment shall be certified as meeting the ANSI/NSF Standard 61. The Director may grant an exception to this requirement on a case by case basis.

(iii) The design shall allow the calcium hypochlorite tablets to be stored in accordance with safety guidelines by the vendor or manufacturer, for example, in their original containers in a cool, dry, well-ventilated area. The calcium hypochlorite tablets shall not be stored near combustible materials and acids to avoid fire or the release of toxic gases.

Guidance: Addition of undissolved hypochlorite tablets directly to drinking water is not an appropriate, ongoing practice.

Guidance: It is recommended that, before selecting the hypochlorite tablet disinfection system, the solubility of calcium hypochlorite tablets in water, water temperature, water hardness, and other water quality factors shall be taken into consideration. Calcium hypochlorite tablet dissolution systems shall not be predicated on production of near-saturated calcium hypochlorite solutions. Slight variations in water temperature or water quality may result in crystallization of calcium hypochlorite from solution with attendant diminishment of the actual concentration of hypochlorite in solution that equipment has been programmed to deliver to the treated water.

(d) Hypochlorite Feed Equipment

(i) Hypochlorite feed equipment shall generally conform with R309-525-11, Chemical Addition; with R309-525-6 for storage and safe handing; with R309-525-7 for feeder design, location, and control; with R309-525-8 for feeder appurtenances such as pumps, day tanks, bulk storage tanks, and feed lines; and R309-525-9 for make-up water supply and protection.

(ii) The hypochlorite feed equipment for drinking water treatment shall be certified meeting the ANSI/NSF Standard 61. The Director may grant an exception to this requirement on a case by case basis.

R309-520-8. Ultraviolet Light.

(1) General Requirements

This rule shall apply to the public drinking water systems that use ultraviolet (UV) disinfection for inactivation of Cryptosporidium, Giardia, and virus. The Director may reduce the requirements of monitoring and reporting on a case by case basis for the water systems that use UV as ancillary means of disinfection and do not claim credit for UV disinfection, or for water systems using UV without a SCADA system and treating less than 30 gallons per minute.

Terminology used in this rule is based on the definitions in the EPA Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule (2006 Final UVDGM).

(a) Water systems using surface water or ground water under the influence of surface water shall not use UV as the sole means of disinfection. For these types of water systems, at least one alternative primary disinfectant must be used for virus disinfection, and a secondary disinfectant shall be provided to maintain a disinfectant residual in the distribution system.

(b) The following requirements apply to the water systems that wish to receive credit for UV disinfection:

(i) The water system shall submit a UV plan which clearly identifies the dose monitoring strategy, such as the UV intensity setpoint approach, the calculated dose approach or an alternative approach.

(ii) The water system shall identify the goals for the UV facility as part of a comprehensive disinfection strategy, including target pathogens, target log inactivation, and corresponding required UV dose per Table 215-5 in R309-215-15(19)(d).

(iii) The water system shall submit a UV reactor validation report in accordance with R309-520-8(2), to the Director for review prior to obtaining approval for installation of UV facility.

(iv) The water system must demonstrate that the reactor is delivering the required UV dose using a validated dose monitoring system and continue to comply with the monitoring and reporting requirements specified in R309-215-15(19) and (20).

(2) Validation Testing

Validation testing must conform to the guidelines in Chapter 5 Validation of UV Reactors of the EPA Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule (2006 Final UVDGM).

The Director may accept a validation report that was conducted based on the 2003 draft UV Disinfection Guidance Manual on a case-by-case basis.

(a) Each model and specific configuration of UV reactor must undergo off-site, full-scale validation testing by an independent third party test facility prior to being approved for use. The validation testing shall be conducted in qualified test facilities that are deemed acceptable by NSF, EPA, or the Director.

(b) Validation testing results shall provide data, including calculations and tables or graphical plots, on dose delivery by the UV reactor under design conditions of flow rate, UV transmittance (UVT), UV intensity, lamp status, power ballast setting, as well as consideration of lamp aging and lamp fouling. The validation report shall demonstrate that the monitoring algorithm is valid over the range expected with the application. The data is used to define the dose monitoring algorithm for the UV reactor and the operating conditions that can be monitored by a utility to ensure that the UV dose required for a given pathogen inactivation credit is delivered.

(c) The UV reactor validation report shall include:

(i) Description of the reactor and validation test set-up, including general arrangement and layout drawings of the reactor and validation test piping arrangement.

(ii) Description of the methods used to empirically validate the reactor.

(iii) Description of the dose monitoring equation for the reactor to achieve the target pathogen inactivation credit and related graphical plots showing how the equation was derived from measured doses obtained through validation testing under varying test conditions.

(iv) Range of validated conditions for flow, UVT, UV dose, and lamp status.

(v) Description and rationale for selecting the challenge organism used in validation testing, and analysis to define operating dose for pathogen inactivation credit.

(vi) Tabulated data, analysis, and Quality assurance/quality control (QA/QC) measures during validation testing.

(vii) A licensed professional engineer's third party oversight certification indicating that the testing and data analyses in the validation report are conducted in a technically sound manner and without bias.

(viii) The validation report shall be companied with completed Checklists 5.1 through 5.5 included in the EPA Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule (2006 Final UVDGM).

(3) Design Criteria

(a) A water system considering UV disinfection shall gather sufficient water quality data prior to design. The water samples shall be representative of the source water to be treated by the UV facility. Frequent testing may be required if significant variation or seasonal trending in water quality is expected.

(b) The following water quality parameters shall be considered in UV facility planning:

(i) UV Transmittance or UV Absorbance

(ii) Calcium

(iii) Alkalinity

(iv) Hardness

(v) Iron

(vi) Manganese

(vii) Turbidity

(viii) pH

(ix) Oxidation-Reduction Potential (ORP)

(x) Particle content and algae

(c) The design flow rate and UVT used to size the UV system shall be selected to provide the required dose at least 95 percent of the time, accounting for seasonal variations of flow and UVT combinations. Specifying a matrix of flow and UVT conditions for the UV reactors may be necessary.

(d) The water system may consider increasing the delivered dose beyond the required UV dose listed in Table 215-5 in R309-215-15(19)(d) to provide flexibility and conservatism.

(e) UV reactor inlet and outlet configurations shall meet the validated hydraulic distribution of flow conditions or be more hydraulically conservative. This can be achieved using one of the following approaches:

(i) The inlet and outlet configuration shall meet one of the conditions specified in Section 3.6.2 of the 2006 Final UVDGM.

(ii) Computational fluid dynamics (CFD)-based modeling may be used to demonstrate that the given conditions of inlet and outlet piping with the UV installation provides equal or greater dose delivery. The CFD modeling shall be conducted at the minimum and maximum values of the validated range of flow, UVT, and lamp status.

(f) The UV disinfection system shall be capable of applying the required design dose with a failed or out-of-service reactor. The design shall account for an on-line backup UV reactor or an operating scheme to apply the design dose with one reactor out of service.

(g) It shall be possible to isolate each reactor for maintenance.

(h) Signals and alarms shall be provided for the operation of the UV facility for the parameters necessary for dose monitoring algorithm, such as low UV dose, high flow rate, low UVT, UVT monitoring failure, UV sensor failure, off specification event, Ground Fault Interrupt (GFI), high water temperature, and low water level.

(i) All materials used in constructing or coating the UV reactors that come in contact with water shall be certified NSF Standard 61 - Drinking Water System Components – Health Effects.

(j) Any chemicals used in the cleaning of the UV reactor components in contact with the drinking water such as quartz sleeves shall be certified as meeting the ANSI/NSF Standard 60 – Drinking Water Treatment Chemicals – Health Effects.

(k) A flow or time delay shall be provided to permit a sufficient time for tube warm-up, per manufacturer recommendations, before water flows from the unit upon start up. The flow or time delay shall be included in the design so they do not result in excessive off specification conditions.

(l) To ensure a continuous supply of power, a backup power supply of sufficient capacity shall be provided for the UV disinfection system. If power quality problems, such as frequent power interruptions or brownouts, or remote location

with unknown power quality, is anticipated, power conditioning equipment, such as uninterruptible power supply (UPS), shall be included in the design.

(m) The design shall include a redundant disinfection mechanism that will apply an approved primary disinfectant to achieve the CT or log removal/inactivation required for compliance if a UV facility is off specification or offline within a maximum response time of 15 minutes. One example of such response is to shut down the off- specification UV train and either bring a parallel UV train on line or initiate a back-up primary disinfection system within 15 minutes, so the continuous duration of an off- specification event is limited to no more than 15 minutes.

(n) UV disinfection units rated at 30 gallons per minute or less shall be certified as meeting the ANSI/NSF Standard 55, Class A, or other equivalent or more stringent validation or certification standards that are deemed acceptable by the Director.

(o) The dose monitoring approach used for UV facility must be reviewed and accepted by the Director. Typically the calculated dose approach is suitable for large systems or systems with significant flow variation, and the UV intensity setpoint approach is for small systems or systems with fixed flow rate. The dose monitoring approaches need to be consistent with the guidelines stated in the 2006 Final UVDGM.

(p) If Programmable Logic Controller (PLC) or SCADA interface is used for UV reactor's process control, the programming shall be in accordance with the validated dose monitoring algorithm and the validated conditions. The algorithm shall use inputs of flow, UV intensity sensor readings, lamps status, and/or UVT equal to or more conservative than values measured during the operation of the UV system. If the measured UVT is above the validated range, the maximum validated UVT shall be used as the input to the dose algorithm. If the measured flow rate is below the validated range, the minimum validated flow rate shall be used as the input to the dose algorithm. If the dose algorithm uses relative lamp output determined from the UV intensity sensor readings as an input, the relative lamp output shall be based on the measured UVT, even if it exceeds the maximum validated UVT.

(q) The UV reactor's PLC or microprocessor shall be programmed to record off specification events for the following conditions:

(i) Delivered UV dose less than the required dose,

(ii) Flow greater than the validated range,

(iii) UVT less than the validated range,

(iv) Lamp status outside the validated range,

(v) Failure of UV sensors, flow meters, or on-line UVT monitors used in the dose calculation. Laboratory measurements of UVT may be used temporarily in the program until the on-line UVT monitor is repaired.

(4) Operation and Maintenance

The operation and maintenance tasks and the frequency of performing them can be specific to the UV equipment installed. The water systems with approved UV installations shall follow the manufacturer's recommendation or the operation & maintenance guidelines stated in Section 6.2 through 6.5 of the *2006 Final UVDGM.*

(a) Startup testing.

(i) The UV reactor manufacturer must provide a site-specific operation and maintenance manual, which shall include the procedure for starting up and shutting down the UV treatment system.

(ii) Provide schedules and performance standards for start-up testing and initial operation. Schedules shall include anticipated start-up date and proposed testing duration. Performance standards shall reference applicable regulations and specific equipment capabilities.

(iii) Operators shall receive site-specific training on the operation of the UV disinfection system.

(b) An incident plan shall be developed to address lamp breakage and release of mercury, response to alarms, power supply interruptions, activation of standby equipment, failure of systems, etc.

(c) To verify that the UV reactors are operated within the validated limits, selected parameters shall be monitored. The routine operation and maintenance shall include the monitoring and calibration requirements listed in R309-215-15(19) and (20) and are in accordance with the monitoring and reporting protocol approved by the Director. For very small UV systems, the Director may consider granting exception to allow reduced monitoring and reporting on a case-by-case basis.

R309-520-9. Ozone.

(1) General Requirements

(a) Ozone is approved as a primary disinfectant, but is not approved as a secondary disinfectant for the distribution system because of its rapid decomposition in aqueous solution. A different disinfectant approved for secondary disinfection must be used if a minimum disinfection residual is required in the distribution system. Ozone may also be used for taste and odor control, oxidation of inorganic and organic compounds and for enhanced performance of other water treatment processes such as microflocculation and filtration. Some of the requirements of this section may not be applicable if ozone is used only for reasons other than primary disinfection.

(b) Pilot studies or bench scale studies shall be conducted for all surface waters unless there is sufficient data available from other studies performed on the same water source. The studies shall determine the initial ozone demand, the rate of ozone decay, the minimum and maximum ozone dosages for the range of water conditions for disinfection "CT" compliance, and the ozone dosage required for other desired benefits. Pilot studies or bench scale studies shall take into account the seasonal and other variations of the source water. Plans for pilot studies or bench scale studies shall be reviewed and accepted by the Director prior to commencement of the studies.

(2) Ozone Generation

(a) The ozone system shall be designed with backup capability such that required inactivation can be achieved with one generator out of service.

(b) The ozone generators shall be housed in an enclosed temperature controlled building for protection. Adequate ventilation shall be provided in the building, and be capable of providing six or more air changes per hour when needed in case of an ozone leak.

(c) The ozone generators shall be of the medium or high frequency type.

(d) The power supply units for the ozone generators shall have a backup electrical power source, normally an emergency generator, or the system shall have an alternate primary disinfection system that may be used in case of an electrical power outage.

(e) The ozone generators shall be water-cooled with a maximum increase in cooling water temperature of 10 ^{o}F (5.6 ^{o}C). If necessary, the cooling water shall be treated to minimize corrosion, scaling, and microbiological fouling of the water side of the tubes. A closed-loop cooling water system may be used to assure proper water conditions are maintained. The power supply units to the ozone generators may also be water cooled.

(f) The ozone generators shall comply with Section 3705 of Chapter 37, “Ozone Gas Generators,” of the 2006 International Fire Code.

(3) Ozone Generator Feed Gas

(a) Feed gas may be air, vaporized high purity liquid oxygen, or oxygen enriched air. Oxygen may be generated on-site or delivered in bulk. Oxygen-enriched air is typically generated on-site.

(b) The design of the feed gas system must ensure that the maximum dew point of the feed gas of -76 ^{o}F (-60 ^{o}C) is not exceeded at any time.

(c) Liquid Oxygen Feed Gas Systems

(i) Liquid oxygen storage tanks shall be sized to provide a minimum of a 7-day supply to the ozone generators at the maximum operating rate.

(ii) There shall be two or more vaporizers to convert liquid oxygen to the gaseous form. Vaporizers must be capable of maintaining oxygen flow at the minimum design air temperature with one unit on standby.

(iii) Liquid oxygen storage tanks and system shall comply with Chapters 40, “Oxidizers,” of the 2006 International Fire Code.

(d) Air or Oxygen Enriched Air Feed Gas Systems

(i) There shall be two or more air compressors to supply air. The capacity of the compressors shall be such that the demand during maximum ozone production and for other compressed air uses at the treatment plant can be met when the largest compressor is out of service.

(ii) Entrainment separators, refrigeration dryers, desiccant dryers, and filters shall be used as necessary to provide a sufficiently dried, dust-free, and oil-free feed gas to the ozone generators. Multiple units of this equipment shall be used so that the ozone generation is not interrupted in the event of a breakdown.

(4) Ozone Contactors

(a) An ozone contactor shall consist of two or more chambers to provide for introduction of ozone into the water and contact time. In a water treatment plant, ozone may be introduced in the raw water, or ozone may be introduced later in the process, such as to settled water after solids have been removed. An ozone contactor must be a closed vessel that is kept under less than atmospheric pressure

to prevent escape of ozone gas. The materials of construction must be ozone-resistant to prevent premature failure of the contactor.

(b) Ozone gas may be injected into the water under positive pressure through bubble diffusers using porous-tube or dome diffusers. Alternatively, ozone gas may be injected into the water using side stream injection. This is where ozone gas is drawn into the side stream using negative pressure, which is generated in a pipe section with a venturi.

(c) An ozone contactor shall be designed to achieve a minimum transfer efficiency of 85 percent.

(d) Multiple sampling points shall be provided in an ozone contactor to enable sampling of treated water for purposes of determining an accurate measure of the concentration to be used in the “CT” disinfection calculation.

(e) A recommended minimum disinfection contact time is ten minutes.

(f) Ozone contactors shall have provision for cleaning, maintenance, and drainage of the contactor. Each contactor chamber shall be equipped with an access hatchway or other means of entry.

(g) An ozone contactor shall have an emergency off-gas pressure/vacuum relief system to prevent damage to the unit.

(h) A system must be provided for worker safety at the end of the ozone contactor for compliance with OSHA standards. Specifically, ozone levels in the gas space above treated water that has exited the contactor must not exceed the established OSHA 8-hour exposure limit of 0.1 ppm. This system may be an ozone residual quenching system where a chemical is used to destroy remaining ozone in the water, or this system may be a monitoring system that provides sufficient time to lower the residual ozone level in the water by natural decay to an acceptable level. Any chemical used to quench residual ozone shall comply with ANSI/NSF Standard 60.

(5) Off-Gas Destruction Units

(a) A system for treating the final off-gas from each ozone contactor must be provided in order to meet safety standards. Systems using thermal destruction or catalytic destruction may be used. At least two units shall be provided which are each capable of handling the entire off-gas flow.

(b) Exhaust blowers shall be provided in order to draw off-gas from the contactor into the destruction units.

(c) Provisions must be made to drain water from condensation in the off-gas piping and to protect the destruction units and piping from moisture and other impurities that may cause damage.

(d) The maximum allowable ozone concentration in the gas discharge from a destruction unit is 0.1 ppm by volume. Provisions may be made for temporary transient concentration spikes that may exceed this limit.

(6) Piping and Connections

(a) Because ozone is a strong oxidant, consideration shall be given to piping materials used in ozone service. Generally, only low carbon 304L and 316L stainless steel shall be used for ozone gas service.

(b) Connections on piping used for ozone service shall be welded where possible. Threaded connections shall be avoided for ozone gas piping because of their tendency to leak. Connections with meters, valves, or other equipment shall be made with flanged joints with ozone-resistant gaskets.

(c) A positive-closing 90-degree turn isolation valve, or other equivalent means, shall be provided in the piping between an ozone generator and a contactor to prevent moisture from reaching the ozone generator during shutdowns.

(7) Instrumentation and Monitoring

(a) A flow meter shall be provided to measure the flow rate of the water being treated. A temperature gauge or transmitter shall also be provided to measure the temperature of the water being treated. The pH shall also be measured to indicate changes in the water being treated.

(b) An ozone gas analyzer, a flow meter, and a temperature measurement shall be provided on the gaseous ozone feed line going to the ozone injection point.

(c) Ozone aqueous residual analyzers shall be provided to measure the ozone residual concentration in the water being treated in order to determine “CT” credit.

(d) An ozone gas analyzer shall be provided on the gas discharge of each ozone destruction unit, or combined vent gas discharge, to determine the exiting ozone concentration.

(e) Ambient ozone monitors shall be installed in the vicinity of the ozone generators, the ozone contactors, the ozone destruction units, and other areas where ozone gas may accumulate.

(f) A continuous dew point monitor shall be provided on the feed gas line to the ozone generators.

(g) Instrumentation such as pressure gauges, temperature gauges, flow meters, and power meters shall be provided as necessary to monitor the feed gas system, ozone generators, power supply units, and cooling water to protect the equipment and monitor performance.

(8) Alarms and Shutdowns

(a) An ambient ozone monitor shall be provided.

(b) The design shall include alarms and shutdowns.

(9) Safety

(a) Training shall be provided to the operators of ozone systems by the manufacturers of the ozone equipment, or other professionals with experience in ozone treatment, to promote the safe operation of the systems.

(b) Appropriate signs shall be installed around ozone and liquid oxygen equipment to warn operators, emergency responders, and others of the potential dangers.

(c) A means shall be provided, such as portable purge air blowers and portable monitors, to reduce residual ozone levels in an ozone contactor or other equipment to safe levels prior to entry for repair, maintenance, or emergency.

(10) Operation and Maintenance

(a) An ambient ozone monitor shall activate an alarm when the ozone level exceeds 0.1 ppm. Because the natural ozone levels can exceed 0.1 ppm under certain atmospheric conditions, it is permissible to set the alarm level at a slightly higher level to avoid nuisance alarms. Ozone generator shutdown shall occur when ambient levels exceed 0.3 ppm in the vicinity of an ozone generator or a contactor. Operators of the water treatment system may set the alarm level and the shutdown level lower at their discretion. It is recommended that an ozone ambient monitor activates a local audible alarm and/or flashing light warning, in addition to an alarm at the operator control system panel.

(b) There shall be an alarm/shutdown to prevent the dew point of the feed gas exceeding the maximum of -76 ^{o}F (-60 ^{o}C).

(c) Alarms and shutdowns shall be programmed based on the pressure gauges, temperature gauges, flow meters, and power meters, to protect the feed gas system, ozone generators, power supply units, and cooling water system.

R309-520-10. Chlorine Dioxide.

The public water systems must take into consideration that chlorine dioxide and its byproducts may have similar effects as chloramines and the impact on sensitive population. Chlorine dioxide shall not be intentionally used as a secondary disinfectant. The water system must monitor the chlorine dioxide residuals and byproducts in the distribution system. If chlorine dioxide residual enters the distribution system and may results in impact on sensitive population, the public water system shall notify the public of the change and/or the schedule for the change, particularly notification to sensitive populations such as hospitals and kidney dialysis facilities serving dialysis patients and fisheries.

(1) Pre-design Proposal

Proposals for the use of chlorine dioxide shall be discussed with the Division prior to the preparation of final plans and specifications. A water system must submit a detailed written proposal to the Director for review, including:

(a) The make, model, and specifications for proposed chlorine dioxide generator

(b) References of other U.S. potable water installations of the proposed unit

(c) Information on the operational and maintenance training program

(d) The expected total applied dosage of chlorine dioxide and other disinfectants as well as the points of application for all disinfectants and the type and amount of residuals and by-products expected in the distribution system

Guidance: It is recommended that the plans, specifications, operating procedures, and emergency response plans be reviewed by a certified safety consultant. Individuals which meet these requirements shall maintain and supervise safety programs and procedures.

(2) Chlorine dioxide generators

(a) Chlorine dioxide generation shall be designed to be efficient compared to industry standard, and production of excess chlorine shall be minimized.

Guidance: Concentrations of chlorine dioxide and chlorite in the plant effluent need to be considered in design and operation to avoid exceeding the MRDL and MCL respectively.

Guidance: Typically a well run generator can operate at more than 95% yield ($[ClO_2]/ \{[ClO_2] + [ClO_2^-] + 67.45/83.45[ClO_3^-]\}$). Maximizing yield will minimize chlorite demand and the possibility of exceeding the chlorite MCL. Discharge of free chlorine from the generator can typically be limited to less than 2% by weight. Free chlorine can contribute to DBP formation.

(b) The generator shall not produce a solution with chlorine dioxide concentration more than 6,000 mg/L to minimize the explosion hazard.

(c) The design shall include capability to measure concentrations of chlorine dioxide, chlorite, chlorate, and free chlorine of the solution leaving the generator.

(d) The chlorine dioxide generator shall be equipped with a chlorine dioxide analyzer to measure the strength of the solution leaving the generator.

(e) Generators which use solid chlorite will not be allowed.

(3) Chlorine Dioxide Feed and Storage System

(a) Chlorine Dioxide Feed system.

(i) Use fiberglass reinforced vinyl ester plastic (FRP) or high density linear polyethylene (HDLPE) tanks with no insulation.

(ii) If centrifugal pumps are used, provide Teflon packing material. Pump motors must be totally enclosed, fan-cooled, equipped with permanently sealed bearings, and equipped with double mechanical seals or other means to prevent leakage.

(iii) Provide chlorinated PVC, vinyl ester or Teflon piping material. Do not use carbon steel or stainless steel piping systems.

(iv) Provide glass view ports for the reactor if it is not made of transparent material.

(v) Provide flow monitoring on all chemical feed lines, dilution water lines, and chlorine dioxide solution lines.

(vi) Provide a means to verify calibrated feed flow to each application feed point.

(vii) Control air contact with chlorine dioxide solution to limit potential for explosive concentrations building up within the feed facility.

(viii) All chlorite solutions shall have concentrations less than 30%. Higher strength solutions are susceptible to crystallization and stratification.

(b) Chlorine Dioxide Storage and Operating Area. The following requirements apply to the chlorite storage and chlorine dioxide day tank area.

(i) The chlorine dioxide facility shall be physically located in a separate room from other water treatment plant operating areas.

(ii) The chlorine dioxide area shall have a ventilation system separate from other operating areas.

(iii) Provision shall be made to ventilate the chlorine dioxide facility area and maintain the ambient air chlorine dioxide concentrations below the Permissible Exposure Limit (PEL).

(A) The ventilating fan(s) take suction near the floor, as far as practical from the door and air inlet, with the point of discharge so located as not to contaminate air inlets of any rooms or structures.

(B) Air inlets are provided near the ceiling.

(C) Air inlets and outlets shall be louvered.

(D) Separate switches for the fans are outside and near the entrance of the facility.

Guidance: Chlorine dioxide has a permissible exposure limit (PEL) in air based on 8 hour work day of 0.1 ppm and a short term exposure limit (STEL) of 0.3 ppm. The odor threshold of chlorine dioxide is about 0.1 ppm. Special measures are needed to protect treatment plant personnel.

(iv) The area housing chlorine dioxide facility shall be constructed of non-combustible materials such as concrete.

(v) There shall be an ambient air chlorine dioxide sensor in the vicinity of the chlorine dioxide operating area. The ambient air chlorine dioxide readouts and alarm or warning light shall be audible and visible in the operating area and on the outside of the door to the operating area. The design shall include distinguishing audible alarms that are triggered by the ambient air chlorine dioxide sensor readings.

(vi) There shall be observation windows through which the operating area can be observed from outside the room to ensure operator safety.

(vii) Manual switches to the light in the operating area shall be located outside the door to the room.

(viii) There shall be an emergency shower and eyewash outside and close to the door to the operating area.

(ix) An emergency shutoff control to shut flows to the generator shall be located outside the operating area.

(x) The design shall minimize the possibility of chlorite leaks.

(xi) The chlorite tank and chlorine dioxide solution tank shall be vented to the outdoors away from any operating areas.

(xii) Gaseous chlorine feed to the chlorine dioxide generator shall enter the chlorine dioxide facility area through lines which can only feed to vacuum.

(xiii) The floor of the chlorine dioxide facility area shall slope to a sump.

(xiv) There shall not be any open drains in the chlorine dioxide operating area.

(xv) Provide secondary containments with sumps for chlorine dioxide storage, and chlorine dioxide solutions which can hold the entire volume of these vessels. This containment shall prevent these solutions from entering the rest of the operating area.

(xvi) Provide wash-down water within the operating area.

(xvii) The operating area shall be designed to avoid direct exposure to sunlight, UV light, or excessive heat.

(4) Other Design Criteria

(a) Provide secondary containment, a sump, wash-down water, and a shower and eyewash at the bulk delivery transfer point.

(b) Finished water shall be used for chlorine dioxide generation.

(c) The finished water line to the chlorine dioxide generator shall be protected with a high hazard assembly.

(d) Provide a water supply near the storage and handling area for cleanup.

(e) The parts of the chlorine dioxide system in contact with the strong oxidizing or acid solutions shall be of inert material.

(f) The design shall provide the capability to shut off the chlorine dioxide operation remotely, i.e., from a location that is outside of the chlorine dioxide operating area.

(5) Operation and Maintenance

(a) Do not store or handle combustible or reactive materials, such as acids, reduced metals, or organic material, in the chlorine dioxide operating area.

(b) Store chemicals in clean, closed, non-translucent containers.

(c) Personal protective equipment and first aid kits shall be stored at a nearby location that is outside the chlorine dioxide facility area.

(d) The temperature of the chlorine dioxide operating area shall be maintained between 60 and 100 °F.

(e) After delivery allow chlorite solutions to equalize with the ambient temperature of the operating area to avoid stratification.

(f) The Operating and Maintenance manual shall include operator safety and emergency response procedures. Personnel shall have ongoing training for operator safety and emergency response procedures.

(g) All wastes shall be disposed of in accordance to any existing solid and hazardous waste regulations.

(h) The operating area shall be inspected daily for chlorite spills and solid chlorite buildup. The daily inspections shall be logged.

(i) Chlorite leaks and solid chlorite buildup shall be cleaned up and disposed of immediately.

(j) Solid chlorite shall be washed down before removal.

Guidance: Solid chlorite is an explosion hazard. Solid chlorite shall be handled with care.

(k) The ventilation system in the chlorine dioxide facility area shall be operated to maintain the ambient air chlorine dioxide concentrations below the Permissible Exposure Limit (PEL).

(l) Audible alarms shall be programmed to alert water treatment plant personnel when the ambient air chlorine dioxide sensor in the vicinity of the chlorine dioxide operating area detects the chlorine dioxide concentration above the Permissible Exposure Limit (PEL) and the Short Term Exposure Limit (STEL).

R309-520-11. Chloramines.

Proposals for the use of Chloramines as a disinfectant shall be discussed with the Division prior to the preparation of final plans and specifications.

Guidance: Chloramines are a much weaker oxidant than free chlorine, ozone or chlorine dioxide and therefore the "CT" values for inactivation of Giardia cysts by chloramines are extremely high and may not be achievable for some systems. Chloramines may be utilized only for secondary disinfection, as necessary to maintain required disinfectant residual concentrations in water entering, or throughout, the distribution system. Chlorine may be added prior to ammonia in producing chloramines, or ammonia prior to chlorine, or even ammonia and chlorine added concurrently. The order of application of chlorine and ammonia to form chloramines is important and source waters must be evaluated to determine which method is most effective.

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R309-525. Facility Design and Operation: Conventional Surface Water Treatment

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R309-525. Facility Design and Operation: Conventional Surface Water Treatment.

R309-525-1. Purpose.

This rule specifies requirements for conventional surface water treatment plants used in public water systems. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-525-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-525-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-525-4. General.

(1) Treatment plants used for the purification of surface water supplies or ground water supplies under direct influence of surface water must conform to the requirements given herein. The plants shall have, as a minimum, facilities for flash mixing of coagulant chemicals, flocculation, sedimentation, filtration and disinfection.

(2) The overall design of a water treatment facility must be carefully examined to assure the compatibility of all devices and processes. The design of treatment processes and devices shall depend on an evaluation of the nature and quality of the particular water to be treated. The combined unit processes shall produce water meeting all established drinking water standards as given in R309-200.

(3) Direct filtration may be acceptable and rules governing this method are given in

R309-530-5.

(4) Refer to R309-530-9 for policy with regards to novel water treatment equipment or techniques which may depart from the requirements outlined herein.

R309-525-5. Plant Capacity and Number of Treatment Trains.

(1) A determination of the required plant capacity and the required number of treatment trains shall be made by the Director after consultation with the Division. Ordinarily, a minimum of two units each for flocculation, sedimentation and filtration must be provided. The design shall provide for parallel or series operation of the clarification stages. Flash mix shall be designed and operated to provide a minimum velocity gradient of 750 fps/ft. Mixing time shall be less than thirty seconds. The treatment plant shall be designed to meet the anticipated "peak day demand" of the system being served when the treatment plant is the system's sole source. When other sources are available to the system, this requirement may be relaxed.

(2) The degree of "back-up" required in a water treatment plant will vary with the number of connections to be served, the availability of other acceptable sources of water, and the ability to control water consumption. Thus, when other sources are available to the system, the requirements of R309-525-7 (Plant Reliability) may also be relaxed. The Division shall be consulted in this regard prior to plant design.

R309-525-6. Plant Siting.

Plants must be sited with due regard for earthquake, flood, and fire hazard. Assistance in this matter is available from the Utah Geologic Survey. The Division shall be consulted regarding site selection prior to the preparation of engineering plans and specifications.

R309-525-7. Plant Reliability.

Plants designed for processing surface water or ground water under direct influence of surface water shall be designed to meet present and future water demands and assure reliable operation at all times. To help assure proper, uninterrupted operation:

(1) A manual override shall be provided for any automatic controls. Highly sophisticated automation may put proper maintenance beyond the capability of the plant operator, leading to equipment breakdowns or expensive servicing. Adequate funding must be assured for maintenance of automatic equipment.

(2) Main switch electrical controls shall be located above grade, in areas not subject to flooding.

(3) Plants shall be operated by qualified personnel approved by the Director. As a minimum, the treatment plant manager is required to be certified in accordance with R309-300 at the grade of the waterworks system with an appropriate unrestricted Utah Operator's Certificate.

(4) The plant shall be constructed to permit units to be taken out of service without disrupting operation, and with drains or pumps sized to allow dewatering in a reasonable period of time.

(5) The plant shall have standby power available to permit operation of essential functions during power outages,

(6) The plant shall be provided with backup equipment or necessary spare parts for all critical items.

(7) Individual components critical to the operation of a treatment plant shall be provided with anchorage to secure the components from loss due to an earthquake event.

R309-525-8. Color Coding and Pipe Marking.

The piping in water treatment plants shall be color coded for identification. The following table contains color schemes recommended by the Division. Identification of the direction of flow and the contained liquid shall also be made on the pipe.

Table 525-1 Recommended Color Scheme for Piping	
Water Lines	
Raw	Olive Green
Settled or Clarified	Aquamarine
Finished	Dark Blue
Chemical Lines	
Alum	Orange
Ammonia	White
Carbon Slurry	Black
Chlorine (Gas and Solution)	Yellow
Fluoride	Light Blue with Red Band
Lime Slurry	Light Green
Potassium Permanganate	Violet
Sulfur Dioxide	Light Green with Yellow Band

Waste Lines	
Backwash Waste	Light Brown
Sludge	Dark Brown
Sewer (Sanitary or Other)	Dark Grey
Other Lines	
Compressed Air	Dark Green
Gas	Red
Other Lines	Light Grey

R309-525-9. Diversion Structures and Pretreatment.

Refer to R309-515-5(5) for diversion structure design.

R309-525-10. Presedimentation.

Waters containing, heavy grit, sand, gravel, leaves, debris, or a large volume of sediments may require pretreatment, usually sedimentation, with or without the addition of coagulation chemicals.

(1) Presedimentation basins shall be equipped for efficient sludge removal.

(2) Incoming water shall be dispersed across the full width of the line of travel as efficiently as practical. Short-circuiting shall be minimized.

(3) Provisions for bypassing presedimentation basins shall be included.

R309-525-11. Chemical Addition.

(1) Standards.

Chemicals used in the treatment of surface water shall achieve the following:

(a) Primary coagulant chemicals shall be utilized to permit the formation of a floc,

(b) Disinfectants shall be added to raw and/or treated water.

(2) Application Criteria.

In achieving these goals the chemical(s) shall be applied to the water:

(a) To assure maximum control and flexibility of treatment,

(b) To assure maximum safety to consumer and operators,

(c) To prevent backflow or back-siphonage of chemical solutions to finished water systems.

(d) With appropriate spacing of chemical feed to eliminate any interference between chemicals.

(3) Typical Chemical Doses.

Chemical doses shall be estimated for each treatment plant to be designed. "Jar tests" shall be conducted on representative raw water samples to determine anticipated doses.

(4) Information Required for Review.

With respect to chemical applications, a submittal for Division review and Director approval shall include:

(a) Descriptions of feed equipment, including maximum and minimum feed rates,

(b) Location of feeders, piping layout and points of application,

(c) Chemical storage and handling facilities,

(d) Specifications for chemicals to be used,

(e) Operating and control procedures including proposed application rates,

(f) Descriptions of testing equipment and procedures, and

(g) Results of chemical, physical, biological and other tests performed as necessary to define the optimum chemical treatment.

(5) Quality of Chemicals.

All chemicals added to water being treated for use in a public water system for human consumption shall comply with ANSI/NSF Standard 60. Evidence for this requirement shall be met if the chemical shipping container labels or material safety data sheets include:

(a) Chemical name, purity and concentrations, Supplier name and address, and

(b) Labeling indicating compliance with ANSI/NSF Standard 60.

Guidance: Blending and re-packaging of one or more certified chemicals by other than the original chemical supplier may void any laboratory certification and the Director may require re-certification of such products before allowing their use.

(6) Storage, Safe Handling and Ventilation of Chemicals.

All requirements of the Utah Occupational Safety and Health Act (UOSHA) for storage, safe handling and ventilation of chemicals shall apply to public drinking water facilities. The designer shall incorporate all applicable UOSHA standards into the facility design, however, review of facility plans by the Director under this Rule shall be limited to the following requirements:

(a) Storage of Chemicals.

(i) Space shall be provided for:

(A) An adequate supply of chemicals,

(B) Convenient and efficient handling of chemicals,

(C) Dry storage conditions.

(ii) Storage tanks and pipelines for liquid chemicals shall be specific to the chemicals and not for alternates.

(iii) Chemicals shall be stored in covered or unopened shipping containers, unless the chemical is transferred into a covered storage unit.

(iv) Liquid chemical storage tanks must:

(A) Have a liquid level indicator, and

(B) Have an overflow and a receiving basin or drain capable of receiving accidental spills or overflows, and meeting all requirements of R309-525-23, and

(C) Be equipped with an inverted "J" air vent.

(v) Acids shall be kept in closed acid-resistant shipping containers or storage units.

(b) Safe Handling.

(i) Material Safety Data Sheets for all chemicals utilized shall be kept and maintained in prominent display and be easily accessed by operators.

(ii) Provisions shall be made for disposing of empty bags, drums or barrels by an acceptable procedure which will minimize operator exposure to dusts.

(iii) Provisions shall be made for measuring quantities of chemicals used to prepare feed solutions.

(c) Dust Control and Ventilation.

Adequate provision shall be made for dust control and ventilation.

(7) Feeder Design, Location and Control.

(a) General Feeder Design.

General equipment design, location and control shall be such that:

(i) feeders shall supply, at all times, the necessary amounts of chemicals at an accurately controlled rate, throughout the anticipated range of feed,

(ii) chemical-contact materials and surfaces are resistant to the aggressiveness of the chemicals,

(iii) corrosive chemicals are introduced in a manner to minimize potential for corrosion,

(iv) chemicals that are incompatible are not fed, stored or handled together.

Guidance: Facilities shall be such that chemicals can be located in a room separate from the main plant in order to reduce hazards and dust problems

(v) all chemicals are conducted from the feeder to the point of application in separate conduits,

(vi) spare parts are available for all feeders to replace parts which are subject to wear and damage,

(vii) chemical feeders are as near as practical to the feed point,

(viii) chemical feeders and pumps operate at no lower than 20 percent of the feed range,

(ix) chemicals are fed by gravity where practical,

(x) be readily accessible for servicing, repair, and observation.

(b) Chemical Feed Equipment.

Where chemical feed is necessary for the protection of the consumer, such as disinfection, coagulation or other essential processes:

(i) a minimum of two feeders, one active and one standby, shall be provided for each chemical,

(ii) the standby unit or a combination of units of sufficient capacity shall be available to replace the largest unit during shut-downs,

(iii) where a booster pump is required, duplicate equipment shall be provided and, when necessary, standby power,

(iv) a separate feeder shall be used for each non-compatible chemical applied where a feed pump is required, and

Guidance: If a common feeder is used for compatible chemicals such as alum and ferric, provisions shall be made for flushing the lines and pumps prior to changing chemical.

(v) spare parts shall be available for all feeders to replace parts which are subject to wear and damage.

(c) Dry Chemical Feeders.

Dry chemical feeders shall:

(i) measure feed rate of chemicals volumetrically or gravimetrically, and

(ii) provide adequate solution water and agitation of the chemical in the solution tank.

(d) Feed Rate Control.

(i) Feeders may be manually or automatically controlled, with automatic controls being designed to allow override by manual controls.

(ii) Chemical feed rates shall be proportional to flows.

(iii) A means to measure water flow rate shall be provided.

(iv) Provisions shall be made for measuring the quantities of chemicals used.

(v) Weighing scales:

(A) shall be provided for weighing cylinders at all plants using chlorine gas,

(B) may be required for fluoride solution feed, where applicable,

(C) shall be provided for volumetric dry chemical feeders, and

(D) shall be accurate to measure increments of 0.5 percent of scale capacity.

(8) Feeder Appurtenances.

(a) Liquid Chemical Solution Pumps.

Positive displacement type solution feed pumps shall be used to feed liquid chemicals, but shall not be used to feed chemical slurries. Pumps must be sized to match or exceed maximum head conditions found at the point of injection. All liquid

chemical feeders shall be provided with devices approved by the Utah Plumbing Code which will prevent the siphoning of liquid chemical through the pump.

(b) Solution Tanks.

(i) A means consistent with the nature of the chemical solution shall be provided in a solution tank to maintain a uniform strength of solution. Continuous agitation shall be provided to maintain slurries in suspension.

Guidance: Two solution tanks of adequate volume may be required for a chemical to assure continuity of supply while servicing a solution tank.

(ii) Means shall be provided to measure the solution level in the tank.

(iii) Chemical solutions shall be kept covered. Large tanks with access openings shall have the openings curbed and fitted with tight overhanging covers.

(iv) Subsurface locations are discouraged, but when used for solution tanks shall:

(A) be free from sources of possible contamination, and

(B) assure positive drainage for ground waters, accumulated water, chemical spills and overflows.

(v) Overflow pipes, when provided, shall:

(A) have a free fall discharge, and

(B) be located where noticeable.

(vi) Acid storage tanks shall be vented to the outside atmosphere, but not through vents in common with day tanks.

(vii) Each tank shall be provided with a valved drain, protected against backflow in accordance with R309-525-11(10)(b) and R309-525-11(10)(c).

(viii) Solution tanks shall be located and protective curbing provided so that chemicals from equipment failure, spillage or accidental drainage shall not enter the water in conduits, treatment or storage basins.

(ix) When polymers are used, storage tanks shall be located away from heat sources and direct sunlight.

(c) Day Tanks.

(i) Day tanks shall be provided where dilution of liquid chemical is required prior to feeding.

(ii) Day tanks shall meet all the requirements of R309-525-11(9)(b).

(iii) Certain chemicals, such as polymers, become unstable after hydration, therefore, day tanks shall hold no more than a thirty hour supply unless manufacturer's recommendations allow for longer periods.

(iv) Day tanks shall be scale-mounted, or have a calibrated gauge painted or mounted on the side if liquid levels cannot be observed in a gauge tube or through translucent sidewalls of the tank. In opaque tanks, a gauge rod extending above a referenced point at the top of the tank, attached to a float may be used. The ratio of the cross-sectional area of the tank to its height must be such that unit readings are meaningful in relation to the total amount of chemical fed during a day.

(v) Hand pumps may be provided for transfer from a carboy or drum. A top rack may be used to permit withdrawal into a bucket from a spigot. Where motor-driven transfer pumps are provided a liquid level limit switch and an overflow from the day tank, which will drain by gravity back into the bulk storage tank, must be provided, unless spill containment is provided for both bulk and day tanks.

(vi) A means which is consistent with the nature of the chemical solution shall be provided to maintain uniform strength of solution in a day tank. continuous agitation shall be provided to maintain chemical slurries in suspension.

(vii) Tanks shall be properly labeled to designate the chemical contained.

(d) Feed Lines.

(i) Feed lines shall be as short as possible in length of run, and be:

(A) of durable, corrosion resistant material,

(B) easily accessible throughout the entire length,

(C) protected against freezing, and

(D) readily cleanable.

(ii) Feed lines shall slope upward from the chemical source to the feeder when conveying gases.

(iii) Lines shall be designed with due consideration of scale forming or solids depositing properties of the water, chemical, solution or mixture conveyed.

(9) Make up Water Supply and Protection.

(a) In Plant Water Supply.

In plant water supply shall be:

(i) Ample in supply, adequate in pressure, and of a quality equal to or better than the water at the point of application.

(ii) Provided with means for measurement when preparing specific solution concentrations by dilution.

(iii) Properly protected against backflow.

Guidance: High calcium content in waters to be treated may interfere with the proposed treatment processes. In these instances, proper treatment for hardness shall be provided.

(b) Cross-Connection Control.

Cross-connection control shall be provided to assure that:

(i) The make-up waterlines discharging to solution tanks shall be properly protected from backflow as required by the Utah Plumbing Code.

(ii) Liquid chemical solutions cannot be siphoned through solution feeders into the process units as required in R309-525-11(9)(c).

(iii) No direct connection exists between any sewer and the drain or overflow from the feeder, solution chamber or tank by providing that all pipes terminate

at least six inches or two pipe diameters, whichever is greater, above the overflow rim of a receiving sump, conduit or waste receptacle.

(iv) Pre- and post-chlorination systems must be independent to prevent possible siphoning of partially treated water into the clear well. The water supply to each eductor shall have a separate shut-off valve. No master shut off valve will be allowed.

(c) Liquid Chemical Feeders, Siphon Control.

Liquid chemical feeders shall be such that chemical solutions cannot be siphoned into the process units, by:

(i) Assuring positive pressure at the point of discharge,

(ii) Providing vacuum relief,

(iii) Providing a suitable air gap, or

(iv) Other suitable means or combinations as necessary.

(10) Operator Safety.

Design of the plant shall be in accordance with the Utah Occupational Safety and Health Act (UOSHA). The designer and public water system management are responsible to see that they incorporate applicable UOSHA standards into the facility design and operation. Review of facility plans by the Division shall be limited to the following requirements:

(a) Floor surfaces shall be smooth and impervious, slip-proof and well drained,

(b) At least one pair of rubber gloves, a dust respirator of a type certified by the National Institute of Occupational Safety and Health (NIOSH) for toxic dusts, an apron or other protective clothing and goggles or face mask shall be provided for each operator, A deluge shower and/or eye washing device shall be installed where strong acids and alkalis are used or stored.

(c) A water holding tank that will allow water to reach room temperature shall be installed in the water line feeding the deluge shower and eye washing device. Other methods of water tempering may be available.

(d) Adequate ventilation shall be provided.

(11) Design for Specific Chemicals.

Design of the plant shall be in accordance with the Utah Occupational Safety and Health Act (UOSHA). The designer and public water system management are responsible to see that they incorporate applicable UOSHA standards into the facility design and operation. Review of facility plans by the Division shall be limited to the following requirements:

Guidance: Chlorine Gas.
Precautions regarding chlorine gas are given in Sections R309-520-10 and R309-520-15.

Acids and Caustics.

(i) Acids and caustics shall be kept in closed corrosion-resistant shipping containers or storage units.

(ii) Acids and caustics shall not be handled in open vessels, but shall be pumped in undiluted form from original containers through suitable hose, to the point of treatment or to a covered day tank.

Sodium Chlorite for Chlorine Dioxide Generation.

Proposals for the storage and use of sodium chlorite shall be approved by the Director prior to the preparation of final plans and specifications. Provisions shall be made for proper storage and handling of sodium chlorite to eliminate any danger of explosion.

(i) Sodium Chlorite Storage: (A) Sodium chlorite shall be stored by itself in a separate room and preferably shall be stored in an outside building detached from the water treatment facility. It shall be stored away from organic materials which would react violently with sodium chlorite; (B) The storage structures shall be constructed of noncombustible materials; (C) If the storage structure is to be located in a area where a fire may occur, water shall be available to keep the sodium chlorite area sufficiently cool to prevent decomposition from heat and resultant potential explosive conditions.

ii) Sodium Chlorite Handling: (A) Care shall be taken to prevent spillage;
(B) An emergency plan of operation shall be available for the clean up of any spillage; (C) Storage drums shall be thoroughly flushed prior to recycling or disposal.

(iii) Sodium Chlorite Feeders: (A) Positive displacement feeders shall be provided; (B) Tubing for conveying sodium chlorite or chlorine dioxide solutions shall be Type 1 PVC, polyethylene or materials recommended by the manufacturer; (C) Feed lines shall be installed in a manner to prevent formation of gas pockets and shall terminate at a point of positive pressure; (D) Check valves shall be provided to prevent the backflow of chlorine into the sodium chlorite line.

R309-525-12. Mixing.

(1) Flash Mix.

(a) Equipment - Mechanical, in-line or jet mixing devices shall be used.

(b) Mixing - All devices used in rapid mixing shall be capable of imparting a minimum velocity gradient (G) of at least 750 fps per foot. Mixing time shall be less than thirty seconds.

(c) Location - The flash mix and flocculation basins shall be as close together as possible.
(d) Introduction of chemicals - Primary coagulant chemicals shall be added at the point of maximum turbulence within the flash mix unit. Where in-line mixing devices are used chemical injection shall be at the most appropriate upstream point.

(2) Flocculation.

(a) Basin design.

Inlet and outlet design shall prevent short-circuiting and destruction of floc. A drain or pumps shall be provided to handle dewatering and sludge removal.

(b) Detention.

The flow-through velocity shall not be less than 0.5 feet per minute nor greater than 1.5 feet per minute with a detention time for floc formation of at least 30 minutes.

(c) Equipment.
Agitators shall be driven by variable speed drives with the peripheral speed of paddles ranging from 0.5 fps to 2.0 fps. Equipment shall be capable of imparting a velocity

gradient (G) between 25 fps per foot and 80 fps per foot to the water treated. Compartmentalized tapered energy flocculation concept may also be used in which G tapers from 100 fps to 10 fps per foot.

(d) Hydraulic flocculation.

Hydraulic flocculation may be permitted and shall be reviewed on a case by case basis. The unit must yield a G value equivalent to that required by b and c above.

(e) Piping.

Flocculation and sedimentation basins shall be as close as possible. The velocity of flocculated water through pipes or conduits to settling basins shall not be less than 0.5 fps nor greater than 1.5 fps. Allowance must be made to minimize turbulence at bends and changes in direction.

(f) Other designs.

Baffling may be used to provide for flocculation in small plants only after approval by the Director. The design shall be such that the velocities and flows noted above will be maintained.

(g) Visible floc.

The flocculation unit shall be capable of producing a visible, settleable floc.

Guidance: If there is significant potential for intercepting wind-blown sediment or debris in the floc basin, a superstructure shall be considered.

R309-525-13. Sedimentation.

(1) General Design Requirements.

Sedimentation shall follow flocculation. The detention time for effective clarification is dependent upon a number of factors related to basin design and the nature of the raw water. The following criteria apply to conventional sedimentation units:

(a) Inlet devices.
Inlets shall be designed to distribute the water equally and at uniform velocities. Open ports, submerged ports, or similar entrance arrangements are required. A baffle shall

be constructed across the basin close to the inlet end and shall project several feet below the water surface to dissipate inlet velocities and provide uniform flows across the basin.

(b) Outlet devices.

Outlet devices shall be designed to maintain velocities suitable for settling in the basin and to minimize short-circuiting. The use of submerged orifices is recommended in order to provide a volume above the orifices for storage when there are fluctuations in the flow.

(c) Emergency Overflow.

An overflow weir (or pipe) shall be installed which will establish the maximum water level desired on top of the filters. It shall discharge by gravity with a free fall to a location where the discharge will be visible.

(d) Sludge Removal.

Sludge removal design shall provide that:

(i) sludge pipes shall be not less than three inches in diameter and arranged to facilitate cleaning,

(ii) entrance to sludge withdrawal piping shall prevent clogging,

(iii) valves shall be located outside the basin for accessibility, and

(iv) the operator may observe and sample sludge being withdrawn from the unit.

(v) Sludge collection shall be accomplished by mechanical means.

(e) Drainage.

Basins shall be provided with a means for dewatering. Basin bottoms shall slope toward the drain not less than one foot in 12 feet where mechanical sludge collection equipment is not provided.

(f) Flushing lines.
Flushing lines or hydrants shall be provided and shall be equipped with backflow prevention devices acceptable to the Director.

(g) Safety.

Appropriate safety devices shall be included as required by the Occupational Safety and Health Act (OSHA).

Guidance: Permanent ladders or handholds shall be provided on the inside walls of basins above the water level

(h) Removal of floating material.

Provision shall be made for the periodic removal of floating material.

Guidance: If there is significant potential for intercepting wind-blown sediment or debris in the sedimentation basin, a superstructure shall be considered

(2) Sedimentation Without Tube Settlers.

If tube settling equipment is not used within settling basins, the following requirements apply:

(a) Detention Time.

A minimum of four hours of detention time shall be provided. Reduced sedimentation time may be approved when equivalent effective settling is demonstrated or multimedia filtration is employed.

(b) Weir Loading.

The rate of flow over the outlet weir shall not exceed 20,000 gallons per day per foot of weir length. Where submerged orifices are used as an alternate for overflow weirs they shall not be lower than three feet below the water surface when the flow rates are equivalent to weir loading.

(c) Velocity.

The velocity through settling basins shall not exceed 0.5 feet per minute. The basins shall be designed to minimize short-circuiting. Fixed or adjustable baffles shall be provided as necessary to achieve the maximum potential for clarification.

(d) Depth.
The depth of the sedimentation basin shall be designed for optimum removal.

(3) Sedimentation With Tube Settlers.

Proposals for settler unit clarification shall be approved by the Director prior to the preparation of final plans and specifications.

Guidance: Settler units consisting of variously shaped tubes or plates which are installed in multiple layers and at an angle to the flow may be used for sedimentation following flocculation.

(a) Inlet and outlet design shall be such to maintain velocities suitable for settling in the basin and to minimize short circuiting.

(b) Flushing lines shall be provided to facilitate maintenance and be properly protected against backflow or back siphonage. Drain and sludge piping from the settler units shall be sized to facilitate a quick flush of the settler units and to prevent flooding other portions of the plant.

(c) Although most units will be located within a plant, design of outdoor installations shall provide sufficient freeboard above the top of settlers to prevent freezing in the units.

Guidance: A cover or enclosure is strongly recommended

(d) The design application rate shall be a maximum rate of 2 gal/sq.ft./min of cross-sectional area (based on 24-inch long 60 degree tubes or 39.5-inch long 7.5 degree tubes), unless higher rates are successfully shown through pilot plant or in-plant demonstration studies.

R309-525-14. Solids Contact Units.

(1) General.

Solids contact units are generally acceptable for combined softening and clarification where water characteristics, especially temperature, do not fluctuate rapidly, flow rates are uniform and operation is continuous. Before such units are considered as clarifiers without softening, specific approval of the Director shall be obtained. A minimum of two units are required for surface water treatment.

Guidance: Clarifiers shall be designed for the maximum uniform rate and shall be adjustable to changes in flow which are less than the design rate and for changes in water characteristics.

(2) Installation of Equipment

The design engineer shall see that a representative of the manufacturer is present at the time of initial start-up operation to assure that the units are operating properly.

(3) Operation of Equipment.

The following shall be provided for plant operation:

(a) a complete outfit of tools and accessories,

(b) necessary laboratory equipment, and

(c) adequate piping with suitable sampling taps so located as to permit the collection of samples of water from critical portions of the units.

(4) Chemical feed.

Chemicals shall be applied at such points and by such means as to insure satisfactory mixing of the chemicals with the water.

(5) Mixing.

A flash mix device or chamber ahead of solids contact units may be required to assure proper mixing of the chemicals applied. Mixing devices employed shall be so constructed as to:

(a) provide good mixing of the raw water with previously formed sludge particles, and

(b) prevent deposition of solids in the mixing zone.

(6) Flocculation.

Flocculation equipment:

(a) shall be adjustable (speed and/or pitch),

(b) shall provide for coagulation in a separate chamber or baffled zone within the unit, and

(c) shall provide the flocculation and mixing period to be not less than 30 minutes.

(7) Sludge concentrators.

(a) The equipment shall provide either internal or external concentrators in order to obtain a concentrated sludge with a minimum of waste water.

(b) Large basins shall have at least two sumps for collecting sludge with one sump located in the central flocculation zone.

(8) Sludge removal.

Sludge removal design shall provide that:

(a) sludge pipes shall be not less than three inches in diameter and so arranged as to facilitate cleaning,

(b) the entrance to the sludge withdrawal piping shall prevent clogging,

(c) valves shall be located outside the tank for accessibility, and

(d) the operator may observe and sample sludge being withdrawn from the unit.

(9) Cross-connections.

(a) Blow-off outlets and drains shall terminate and discharge at places satisfactory to the Director.

(b) Cross-connection control must be included for the finished drinking water lines used to back flush the sludge lines.

(10) Detention period.

The detention time shall be established on the basis of the raw water characteristics and other local conditions that affect the operation of the unit. Based on design flow rates, the detention time shall be:

(a) two to four hours for suspended solids contact clarifiers and softeners treating surface water, and

(b) one to two hours for suspended solids contact softeners treating only ground water.

(11) Suspended slurry concentrate.

Softening units shall be designed so that continuous slurry concentrates of one percent or more, by weight, can be satisfactorily maintained.

(12) Water losses.

(a) Units shall be provided with suitable controls for sludge withdrawal.

(b) Total water losses shall not exceed:

(i) five percent for clarifiers,

(ii) three percent for softening units.

(c) Solids concentration of sludge bled to waste shall be:

(i) three percent by weight for clarifiers,

(ii) five percent by weight for softeners.

(13) Weirs or orifices.

The units shall be equipped with either overflow weirs or orifices constructed so that water at the surface of the unit does not travel over 10 feet horizontally to the collection trough.

(a) Weirs shall be adjustable, and at least equivalent in length to the perimeter of the basin.

(b) Weir loading shall not exceed:

(i) 10 gpm per foot of weir length for units used for clarifiers

(ii) 20 gpm per foot of weir length for units used for softeners.

(c) Where orifices are used the loading rates per foot of launderer shall be equivalent to weir loadings. Either shall produce uniform rising rates over the entire area of the tank.

(14) Upflow rates.

Upflow rates shall not exceed:

(a) 1.0 gpm/sf at the sludge separation line for units used for clarifiers,

(b) 1.75 gpm/sf at the slurry separation line for units used as softeners.

R309-525-15. Filtration.

(1) General.

Filters may be composed of one or more media layers. Mono-media filters are relatively uniform throughout their depth. Dual or multi-layer beds of filter material are so designed that water being filtered first encounters coarse material, and progressively finer material as it travels through the bed.

(2) Rate of Filtration.

(a) The rate of filtration shall be determined through consideration of such factors as raw water quality, degree of pretreatment provided, filter media, water quality control parameters, competency of operating personnel, and other factors as determined by the Director. Generally, higher filter rates can be assigned for the dual or multi-media filter than for a single media filter because the former is more resistant to filter breakthrough.

(b) The filter rate shall be proposed and justified by the designing engineer to the satisfaction of the Director prior to the preparation of final plans and specifications.

(c) The use of dual or multi-media filters may allow a reduction of sedimentation detention time (see R309-525-13(2)(a)) due to their increased ability to store sludge.

(d) Filter rates assigned by the Director must never be exceeded, even during backwash periods.

(e) The use of filter types other than conventional rapid sand gravity filters must receive written approval from the Director prior to the preparation of final plans and specifications.

(3) Number of Filters Required.

At least two filter units shall be provided. Where only two filter units are provided, each shall be capable of meeting the plant design capacity (normally the projected peak day demand) at the approved filtration rate. Where more than two filter units are provided, filters shall be capable of meeting the plant design capacity at the approved filtration rate with one filter removed from service. Refer to R309-525-5 for situations where these requirements may be relaxed.

(4) Media Design.

R309-525-15(4)(a) through R309-525-15(4)(e), which follow, give requirements for filter media design. These requirements are considered minimum and may be made more stringent if deemed appropriate by the Director.

(a) Mono-media, Rapid Rate Gravity Filters.

The allowable maximum filtration rate for a silica sand, mono-media filter is three gpm/sf This type of filter is composed of clean silica sand having an effective size of 0.35 mm to 0.65 mm and having a uniformity coefficient less than 1.7. The total bed thickness must not be less than 24 inches nor generally more than 30 inches.

(b) Dual Media, Rapid Rate Gravity Filters.

The following applies to all dual media filters:

(i) Total depth of filter bed shall not be less than 24 inches nor generally more than 30 inches.

(ii) All materials used to make up the filter bed shall be of such particle size and density that they will be effectively washed at backwash rates between 15 and 20 gpm/sf They must settle to reconstitute the bed essentially in the original layers upon completion of backwashing.

(iii) The bottom layer must be at least ten inches thick and consist of a material having an effective size no greater than 0.45 mm and a uniformity coefficient not greater than 1.5.

(iv) The top layer shall consist of clean crushed anthracite coal having an

effective size of 0.45 mm to 1.2 mm, and a uniformity coefficient not greater than 1.5.

(v) Dual media filters will be assigned a filter rate up to six gpm/sf. Generally if the bottom fine layer consists of a material having an effective size of 0.35 mm or less, a filtration rate of six gpm/sf can be assigned.

(vi) Each dual media filter must be provided with equipment which shall continuously monitor turbidity in the filtered water. The equipment shall be so designed to initiate automatic backwash if the filter effluent turbidity exceeds 0.3 NTU. If the filter turbidity exceeds one NTU, filter shutdown is required. In plants attended part-time, this shutdown must be accomplished automatically and shall be accompanied by an alarm. In plants having full-time operators, a one NTU condition need only activate an alarm. Filter shutdown may then be accomplished by the operator.

Guidance: Due to increased media storage capacity the use of dual media filters may allow a reduction of detention time within sedimentation basins. Refer to R309-525-13(2)(a). Allowable reduction of sedimentation time will be determined by the Director.

(c) Tri-Media, Rapid Rate Gravity Filters.

The following applies to all Tri-media filters:

(i) Total depth of filter bed shall not be less than 24 inches nor generally more than 30 inches.

(ii) All materials used to make up the filter bed shall be of such particle size and density that they will be effectively washed at backwash rates between 15 and 20 gpm/sf. They must settle to reconstitute the bed to the normal gradation of coarse to fine in the direction of flow upon completion of backwashing.

(iii) The bottom layer must be at least four inches thick and consist of a material having an effective size no greater than 0.45 mm and uniformity coefficient not greater than 2.2. The bottom layer thickness may be reduced to three inches if it consists of a material having an effective size no greater than 0.25 mm and a uniformity coefficient not greater than 2.2.
(iv) The middle layer must consist of silica sand having an effective size of 0.35 mm to 0.8 mm, and a uniformity coefficient not greater than 1.8.

(v) The top layer shall consist of clean crushed anthracite coal having an effective size of 0.45 mm to 1.2 mm, and a uniformity coefficient not greater than 1.85.

(vi) Tri-media filters will be assigned a filter rate up to 6 gpm/sf. Generally, if the bottom fine layer consists of a material having an effective size of 0.35 mm or less, a filtration rate of six gpm/sf can be assigned.

(vii) Each Tri-media filter must be provided with equipment which shall continuously monitor turbidity in the filtered water. The equipment shall be so designed to initiate automatic backwash if the effluent turbidity exceeds 0.3 NTU. If the filter turbidity exceeds one NTU, filter shutdown is required. In plants attended part-time, this shutdown must be accomplished automatically and shall be accompanied by an alarm. In plants having full-time operators, a one NTU condition need only activate an alarm. Filter shutdown may then be accomplished by the operator.

Guidance: Due to increased media storage capacity, the use of Tri-media filters may allow a reduction of detention time within sedimentation basins. Refer to R309-525-13(2)(a). Allowable reduction of sedimentation time will be determined by the Director.

(d) Granulated Activated Carbon (GAC).

Use of granular activated carbon media shall receive the prior approval of the Director, and must meet the basic specifications for filter material as given above, and:

(i) There shall be provision for adding a disinfectant to achieve a suitable residual in the water following the filters and prior to distribution,

(ii) There shall be a means for periodic treatment of filter material for control of biological or other growths,

(iii) Facilities for carbon regeneration or replacement must be provided.

(e) Other Media Compositions and Configurations.

Filters consisting of materials or configurations not prescribed in this section will be considered on experimental data or available operation experience.

(5) Support Media, Filter Bottoms and Strainer Systems.

Care must be taken to insure that filter media, support media, filter bottoms and strainer systems are compatible and will give satisfactory service at all times.

(a) Support Media.

The design of support media will vary with the configuration of the filtering media and the filter bottom. Thus, support media and/or proprietary filter bottoms shall be reviewed on a case-by-case basis.

Guidance: Guidelines for two types of support media commonly used are as follows:

(1) Torpedo Sand- A three inch layer of torpedo sand shall be used as a supporting media for the filter sand in single media filters and shall have: (A) Effective size of 0.3 mm to 2.0 mm, and (B) Uniformity coefficient not greater than 1.7.

(2) Gravel- Gravel, when used as the supporting media, shall consist of hard, rounded particles and shall not include flat or elongated particles. The coarsest gravel shall be 2.5 inches in size when the gravel rests directly on the strainer system, and shall extend above the top of the perforated laterals. Not lass than four layers of gravel shall be provided in accordance with the following size and depth distribution when used with perforated laterals:

Guidance Support Gravel	
Size	***Depth***
2-1/2 to 1-1/2 inches	***5 to 8 inches***
1-1/2 to 3/4 inches	***3 to 5 inches***
3/4 to ½ inches	***3 to 5 inches***
½ to 3/16 inches	***2 to 3 inches***
3/16 to 3/32 inches	***2 to 3 inches***

(3) When proprietary filter bottoms are specified a reduction of gravel depths may be considered if such a reduction can be justified to the satisfaction of the Director.

(b) Filter Bottoms and Strainer Systems.

(i) The design of manifold type collection systems shall:

(A) Minimize loss of head in the manifold and laterals,

(B) Assure even distribution of washwater and even rate of filtration over the entire area of the filter,

(C) Provide a ratio of the area of the final openings of the strainer system to the area of the filter of about 0.003,

(D) Provide the total cross-sectional area of the laterals at about twice the total area of the final openings,

(E) Provide the cross-sectional area of the manifold at 1.5 to 2 times the total area of the laterals.

(ii) Departures from these standards may be acceptable for high rate filter and for proprietary bottoms.

(iii) Porous plate bottoms shall not be used where calcium carbonate, iron or manganese may clog them or with waters softened by lime.

(6) Structural Details and Hydraulics.

The filter structure shall be so designed as to provide for:

(a) Vertical walls within the filter,

(b) No protrusion of the filter walls into the filter media,

(c) Cover by superstructure,

(d) Head room to permit normal inspection and operation,

(e) Minimum water depth over the surface of the filter media of three feet, unless an exception is granted by the Director,

(f) Maximum water depth above the filter media shall not exceed 12 feet,

(g) Trapped effluent to prevent backflow of air to the bottom of the filters,

(h) Prevention of floor drainage to enter onto the filter by installation of a minimum four inch curb around the filters,

(i) Prevention of flooding by providing an overflow or other means of control,

(j) Maximum velocity of treated water in pipe and conduits to filters of two fps,

(k) Cleanouts and straight alignment for influent pipes or conduits where solids loading is heavy or following lime-soda softening,

(l) Washwater drain capacity to carry maximum flow,

(m) Walkways around filters, to be not less than 24 inches wide,

(n) Safety handrails or walls around filter areas adjacent to normal walkways,

(o) No common wall between filtered and unfiltered water shall exist. This requirement may be waived by the Director for small "package" type plants using metal tanks of sufficient thickness,

(p) Filtration to waste for each filter.

(7) Backwash.

(a) Water Backwash Without Air.

Water backwash systems shall be designed so that backwash water is not recycled to the head of the treatment plant unless it has been settled, as a minimum. Furthermore, water backwash systems; including tanks, pumps and pipelines, shall:

(i) Provide a minimum backwash rate of 15 gpm/sf, consistent with water temperatures and the specific gravity of the filter media. The design shall provide for adequate backwash with minimum media loss. A reduced rate of 10 gpm/sf may be acceptable for full depth anthracite or granular activated carbon filters.

Guidance: A rate of 20 gpm/sf or a rate necessary to provide for a 50 percent expansion of the filter bed is recommended.

(ii) provide finished drinking water at the required rate by washwater tanks, a washwater pump, from the high service main, or a combination of these.

(iii) Permit the backwashing of any one filter for not less than 15 minutes.

(iv) Be capable of backwashing at least two filters, consecutively.

(v) Include a means of varying filter backwash rate and time.

(vi) Include a washwater regulator or valve on the main washwater line to obtain the desired rate of filter wash with washwater valves or the individual filters open wide.

(vii) Include a rate of flow indicator, preferably with a totalizer on the main washwater line, located so that it can be easily read by the operator during the washing process.

(viii) Be designed to prevent rapid changes in backwash water flow.

(ix) Use only finished drinking water.

(x) Have washwater pumps in duplicate unless an alternate means of obtaining washwater is available.

(xi) Perform in conjunction with "filter to waste" system to allow filter to stabilize before introduction into clearwell.

(b) Backwash with Air Scouring.

Air scouring can be considered in place of surface wash when:

(i) air flow for air scouring the filter must be 3 to 5 scfm/sf of filter area when the air is introduced in the underdrain; a lower air rate must be used when the air scour distribution system is placed above the underdrains,

(ii) a method for avoiding excessive loss of the filter media during backwashing must be provided,

(iii) air scouring must be followed by a fluidization wash sufficient to restratify the media,

(iv) air must be free from contamination,

(v) air scour distribution systems shall be placed below the media and supporting bed interface; if placed at the interface the air scour nozzles shall be designed to prevent media from clogging the nozzles or entering the air distribution system.

(vi) piping for the air distribution system shall not be flexible hose which will collapse when not under air pressure and shall not be a relatively soft material which may erode at the orifice opening with the passage of air at high velocity.

(vii) air delivery piping shall not pass down through the filter media nor shall there be any arrangement in the filter design which would allow short circuiting between the applied unfiltered water and the filtered water,

(viii) consideration shall be given to maintenance and replacement of air delivery piping,

(ix) when air scour is provided the backwash water rate shall be variable and shall not exceed eight gpm/sf unless operating experience shows that a higher rate is necessary to remove scoured particles from filter surfaces.

(x) the filter underdrains shall be designed to accommodate air scour piping when the piping is installed in the underdrain, and

(xi) the provisions of Section R309-525-15(7)(a) (Backwash) shall be followed.

(8) Surface Wash or Subsurface Wash.

Surface wash or subsurface wash facilities are required except for filters used exclusively for iron or manganese removal. Washing may be accomplished by a system of fixed nozzles or a revolving-type apparatus, provided:

(a) Provisions for water pressures of at least 45 psi,

(b) A properly installed vacuum breaker or other approved device to prevent back-siphonage if connected to a finished drinking water system,

(c) All washwater must be finished drinking water,

(d) Rate of flow of two gpm/sf of filter area with fixed nozzles or 0.5 gpm/sf with revolving arms.

(9) Washwater Troughs.

Washwater troughs shall be so designed to provide:

(a) The bottom elevation above the maximum level of expanded media during washing,

(b) A two inch freeboard at the maximum rate of wash,

(c) The top edge level and all edges of trough at the same elevation

(d) Spacing so that each trough serves the same number of square feet of filter areas,

(e) Maximum horizontal travel of suspended particles to reach the trough not to exceed three feet.

(10) Appurtenances.

(a) The following shall be provided for every filter:

(i) Sample taps or means to obtain samples from influent and effluent,

(ii) A gauge indicating loss of head,

(iii) A meter indicating rate-of-flow. A modified rate controller which limits the rate of filtration to a maximum rate may be used. However, equipment that simply maintains a constant water level on the filters is not acceptable, unless the rate of flow onto the filter is properly controlled,

(iv) A continuous turbidity monitoring device where the filter is to be loaded at a rate greater than three gpm/sf

(v) Provisions for draining the filter to waste with appropriate measures for backflow prevention (see R309-525-23).

(i) Wall sleeves providing access to the filter interior at several locations for sampling or pressure sensing,

(ii) A 1.0 inch to 1.5 inch diameter pressure hose and storage rack at the operating floor for washing filter walls.

Guidance: The following shall be provided for every filter:

(1) Wall sleeves providing access to the filter interior at several locations for sampling or pressure sensing,

(2) A 1.0 inch to 1.5 inch diameter pressure hose and storage rack at the operating floor for washing filter walls.

(11) Miscellaneous.

Roof drains shall not discharge into filters or basins and conduits preceding the filters.

R309-525-16. In-Plant Finished Drinking Water Storage.

(1) General.

In addition to the following, the applicable design standards of R309-545 shall be followed for plant storage.

(a) Backwash Water Tanks.

Backwash water tanks shall be sized, in conjunction with available pump units and finished water storage, to provide the backwash water required by R309-525-15(7). Consideration shall be given to the backwashing of several filters in rapid succession.

(b) Clearwell.

Clearwell storage shall be sized, in conjunction with distribution system storage, to relieve the filters from having to follow fluctuations in water use.

(i) When finished water storage is used to provide the contact time for chlorine (see R309-520-10(1)(f), especially sub-section (f)(iv)), special attention must be given to size and baffling.

(ii) To ensure adequate chlorine contact time, sizing of the clearwell shall include extra volume to accommodate depletion of storage during the nighttime for intermittently operated filtration plants with automatic high service pumping from the clearwell during non-treatment hours.
(iii) An overflow and vent shall be provided.

(2) Adjacent Compartments.

Finsihed drinking water shall not be stored or conveyed in a compartment adjacent to unsafe water when the two compartments are separated by a single wall. The Director may grant an exception to this requirement for small "package" treatment plants using metal tanks of sufficient wall thickness.

(3) Basins and Wet-Wells.

Receiving basins and pump wet-wells for finished drinking water shall be designed as drinking water storage structures. (See Section R309-545)

R309-525-17. Miscellaneous Plant Facilities.

(1) Laboratory.

Sufficient laboratory equipment shall be provided to assure proper operation and monitoring of the water plant. A list of required laboratory equipment is:

(a) one floc testing apparatus with illuminated base and variable speed stirrer,

(b) 10 each 1000 ml Griffin beakers (plastic is highly recommended over glass to prevent breakage),

(c) one 1000 ml graduated cylinder (plastic is highly recommended over glass to prevent breakage),

(d) pH test strips (6.0 to 8.5),

(e) five wide mouth 25 ml Mohr pipets,

(f) one triple beam, single pan or double pan balance with 0.1 g sensitivity and 2000 g capacity (using attachment weights),

(g) DPD chlorine test kit,

(h) bench-top turbidimeter,
(i) five each 1000 ml reagent bottles with caps,

(j) dish soap,

(k) brush (2 3/4 inch diameter by 5 inch),

(l) one platform scale 1/2 lb sensitivity, 100 lb capacity,

(m) book - Simplified Procedures for Water Examination, AWWA Manual M12

(2) Continuous Turbidity Monitoring and Recording Equipment.

Continuous turbidity monitoring and recording facilities shall be located as specified in R309-215-9.

(3) Sanitary and Other Conveniences.

All treatment plants shall be provided with finished drinking water, lavatory and toilet facilities unless such facilities are otherwise conveniently available. Plumbing must conform to the Utah Plumbing Code and must be so installed to prevent contamination of a public water supply.

R309-525-18. Sample Taps.

Sample taps shall be provided so that water samples can be obtained from appropriate locations in each unit operation of treatment. Taps shall be consistent with sampling needs and shall not be of the petcock type. Taps used for obtaining samples for bacteriological analysis shall be of the smooth-nosed type without interior or exterior threads, shall not be of the mixing type, and shall not have a screen, aerator, or other such appurtenance.

R309-525-19. Operation and Maintenance Manuals.

Operation and maintenance manuals shall be prepared for the treatment plant and found to be acceptable by the Director. The manuals shall be usable and easily understood. They shall describe normal operating procedures, maintenance procedures and emergency procedures.

R309-525-20. Operator Instruction.

Provisions shall be made for operator instruction at the start-up of a plant.

R309-525-21. Safety.

All facilities shall be designed and constructed with due regard for safety, comfort and convenience. As a minimum, all applicable requirements of Utah Occupational Safety and Health Act (UOSHA) must be adhered to.

R309-525-22. Disinfection Prior To Use.

All pipes, tanks, and equipment which can convey or store finished drinking water shall be disinfected in accordance with the following AWWA procedures:

(1) C651-05 Disinfecting Water Mains

(2) C652-02 Disinfection of Water Storage Facilities

(3) C653-03 Disinfection of Water Treatment Plants

R309-525-23. Disposal of Treatment Plant Waste.

Provisions must be made for proper disposal of water treatment plant waste such as sanitary, laboratory, sludge, and filter backwash water. All waste discharges and treatment facilities shall meet the requirements of the plumbing code, the Utah Department of Environmental Quality, the Utah Department of Health, and the United States Environmental Protection Agency, including the following:

(1) Rules for Onsite Wastewater Disposal Systems, Utah Administrative Code R317-4.

(2) Rules for Water Quality, Utah Administrative Code R317.

(3) Rules for Solid and Hazardous Waste, Utah Administrative Code R315.

In locating waste disposal facilities, due consideration shall be given to preventing potential contamination of a water supply as well as breach or damage due to environmental factors.

R309-525-24. Other Considerations.

Consideration shall be given to the design requirements of other federal, state, and local regulatory agencies for items such as safety requirements, special designs for the handicapped, plumbing and electrical codes, construction in the flood plain, etc.

R309-525-25. Operation and Maintenance.

(1) Water system operators must determine that all chemicals added to water intended for human consumption are suitable for drinking water use and comply with ANSI/NSF Standard 60.

(2) No chemicals or other substances may be added to public water supplies unless the chemical addition facilities and chemical type have been reviewed and approved by the Director. The Director shall be notified prior to the changing of primary coagulant type. The Director may require documentation to verify that sufficient testing and analysis have been done. The primary coagulant may not be changed without prior approval from the Director.

(3) During the operation of a conventional surface water treatment plant stable flow rates shall be maintained through the filters.

Guidance: Water shall not be introduced into the system immediately after backwashing. Rather, water shall be filtered to waste. A "dirty filter" shall not be started and immediately introduced into the system. If the filter has sat idle for an extended period, or if the filter is sufficiently "dirty", backwash and filter to waste before introducing the water.

(4) All instrumentation needed to verify that treatment processes are sufficient shall be properly calibrated and maintained. As a minimum, this shall include turbidimeters.

KEY: drinking water, flocculation, sedimentation, filtration
Date of Enactment or Last Substantive Amendment: July 1, 2013
Notice of Continuation: March 22, 2010
Authorizing, and Implemented or Interpreted Law: 19-4-104

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R309-530 Facility Design and Operation: Alternative Surface Water Treatment Methods.

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R309-530. Facility Design and Operation: Alternative Surface Water Treatment Methods.

R309-530-1. Purpose.

This rule specifies requirements for alternative surface water treatment methods. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-530-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-530-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-530-4. General.

(1) Alternative Methods.

In addition to conventional surface water treatment method (i.e. coagulation, sedimentation and filtration as outlined in R309-525), several alternative methods may also be suitable. They are: Direct Filtration; Slow Sand Filtration; Membrane Filtration; and Diatomaceous Earth Filtration.

(2) Incorporation of Other Rules.

For each process described in this section pertinent rules are given. The designer shall also

incorporate the relevant rules given in other sections into the plans and specifications for any of these specialized treatment methods. Where applicable, the following topics shall be addressed:

(a) Plant Siting (see R309-525-6).

(b) Pre-design Submittal (see R309-515-5(2)).

(c) Plant Reliability (see R309-525-7).

(d) Color Coding and Pipe Marking (see R309-525-8).

(e) Chemical Addition (see R309-525-11).

(f) Miscellaneous Plant Facilities (see R309-525-17, particularly sub-section R309-525-17(1), Laboratory).

(g) Operation and Maintenance Manuals (see R309-525-19).

(h) Safety (see R309-525-21).

(i) Disposal of Treatment Plant Waste (see R309-525-23).

(j) Disinfection (see R309-520).

R309-530-5. Direct Filtration.

(1) Chemical Addition and Mixing.

Direct Filtration is conventional surface water treatment without the sedimentation process. Rules for Chemical Addition and Mixing shall be the same as found in sections R309-525-11 and R309-525-12.

(2) Source Water Quality.

Direct Filtration applies the destabilized colloids to the filter rather than removing the majority of the load through sedimentation. While this process represents considerable construction cost savings, the source water must have low average turbidity in order to provide reliable service without excessive backwash requirements. Source water with low average turbidity is generally only obtained from large capacity reservoirs.

(3) Design Requirements.

The following requirements shall apply to Direct Filtration plants:

(a) At least one year's record of source water turbidity, sampled at least once per week, shall be presented to the Director. A Direct Filtration facility will only be permitted if the data shows that 75% of the measurements are below five (5) NTU. The Director shall judge whether Direct Filtration is suitable given the quality of the proposed source water (see R309-515-5(2)(a)(ii)).

(b) Pilot plant studies, acceptable to the Director, shall be conducted prior to the preparation of final engineering plans.

(c) Requirements for flash mix and flocculation basin design are given in sub-sections R309-525-12(1) and R309-525-12(2).

(d) Chemical addition and mixing equipment shall be designed to be capable of providing a visible, but not necessarily settleable, floc.

(e) Surface wash, subsurface wash, or air scour shall be provided for the filters in accordance with sub-section R309-525-15(7).

(f) A continuous monitoring turbidimeter shall be installed on each filter effluent line and shall be of a type with at least two alarm conditions capable of meeting the requirements of subsections R309-525-15(4)(b)(vi) or R309-525-15(4)(c)(vii). The combined plant effluent shall be equipped with a continuous turbidimeter having a chart recorder. Additional monitoring equipment to assist in control of the coagulant dose may be required (i.e. streaming current gauges, particle counters, etc.) if the plant cannot consistently meet the requirements of rule R309-200.

(g) In addition to the alarm conditions required above, the plant shall be designed and operated so that the plant will automatically shut down when a source water turbidity of 20 NTU lasts longer than three hours, or when the source water turbidity exceeds 30 NTU at any time.

(h) The plant design and land ownership surrounding the plant shall allow for the installation of conventional sedimentation basins. Sedimentation basins may be required if the Director determines the plant is failing to meet minimum water quality or performance standards.

R309-530-6. Slow Sand Filtration.

(1) Acceptability.

Slow sand filtration means a process involving passage of raw water through a bed of sand at low velocity resulting in substantial particle removal by physical and biological mechanisms. The acceptability of slow sand filters as a substitute for "conventional surface water treatment" facilities (detailed in R309-525) shall be determined by the Director based on suitability of the source water and demand characteristics of the system.

(2) Source Water Quality.

The Director may impose design requirements in addition to those listed herein, in allowing this process. The following shall be considered, among other factors, in determining whether slow sand filtration will be acceptable:

(a) Source water turbidity must be low and consistent. Slow Sand Filtration shall be utilized only when the source waters have turbidity less than 50 NTU and color less than 30 units (see R309-515-5(2)(a)).

(b) The nature of the turbidity particles shall be considered. Turbidity must not be attributable to colloidal clay.

(c) The nature and extent of algae growths in the raw water shall be considered. Algae must not be a species considered as filter and screen-clogging algae as indicated in "Standard Methods for the Examination of Water and Wastewater" prepared and published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. High concentrations of algae in the raw water can cause short filter runs; the amount of algae, expressed as the concentration of chlorophyll "a" in the raw water shall not exceed 0.005 mg/l.

(3) Pilot Plant Studies.

The Director shall allow the use of Slow Sand Filtration only when the supplier's engineering studies show that the slow sand facility can consistently produce an effluent meeting the quality requirements of rule R309-200. The Director shall be consulted prior to the detailed design of a slow sand facility.

(4) Operation.

Effluent from a Slow Sand Filtration facility shall not be introduced into a public water supply until an active biological mat has been created on the filter.

(5) Design requirements.

The following design parameters shall apply to each Slow Sand Filtration plant:

(a) At least three filter units shall be provided. Where only three units are provided, any two shall be capable of meeting the plant's design capacity (normally the projected "peak daily flow") at the approved filtration rate. Where more than three filter units are provided, the filters shall be capable of meeting the plant design capacity at the approved filtration rate with any one filter removed from service.

(b) All filters shall be protected to prevent freezing. If covered by a structure, enough headroom shall exist to permit normal movement by operating personnel for scraping and sand removal operations. There shall be adequate manholes and access ports for the handling of sand. An overflow at the maximum filter water level shall be provided.

(c) The permissible rates of filtration shall be determined by the quality of the source water and shall be determined by experimental data derived during pilot studies conducted on the source water. Filtration rates of 0.03 gpm/sf to 0.1 gpm/sf shall be acceptable (equivalent to two to six million gallons per day per acre). Somewhat higher rates may be acceptable when demonstrated to the satisfaction of the Director.

(d) Each filter unit shall be equipped with a main drain and an adequate number of lateral underdrains to collect the filtered water. The underdrains shall be so spaced that the maximum velocity of the water flow in the underdrain will not exceed 0.75 fps. The maximum spacing of the laterals shall not exceed three feet if pipe laterals are used.

(e) Filter sand shall be placed on graded gravel layers for an initial filter sand depth of 30 inches. A minimum of 24 inches of filter sand shall be present, even after scraping. The effective size of the filter sand shall be between 0.30 mm and 0.45 mm in diameter. The filter sand uniformity coefficient shall not exceed 2.5. Further, the sand shall throughly washed and found to be clean and free from foreign matter.

(f) A three-inch layer of well rounded sand shall be used as a supporting media for filter sand. It shall have an effective size of 0.8 mm to 2.0 mm in diameter and the uniformity coefficient shall not be greater than 1.7.

(g) A supporting gravel media shall be provided. It shall consist of hard, durable, rounded silica particles and shall not include flat or elongated particles. The coarsest gravel shall be 2.5 inches in size when the gravel rests directly on the strainer system, and must extend above the top of the perforated laterals. Not less than four layers of gravel shall be provided in accordance with the following size and depth distribution when used with perforated laterals:

Table 530-1	
Size	Depth
2 ½ to 1 ½ inches	5 to 8 inches
1 ½ to 3/4 inches	3 to 5 inches
3/4 to ½ inches	3 to 5 inches
½ to 3/16 inches	2 to 3 inches
3/16 to 3/32 inches	2 to 3 inches

Reduction of gravel depths may be considered upon justification to the Director when proprietary filter bottoms are specified.

(h) Slow sand filters shall be designed to provide a depth of at least three to five feet of water over the sand.

(i) Each filter shall be equipped with: a loss of head gauge; an orifice, venturi meter, or other suitable metering device installed on each filter to control the rate of filtration; and an effluent pipe designed to maintain the water level above the top of the filter sand.

(j) Disinfection of the effluent of Slow Sand Filtration plants will be required.

(k) A filter-to-waste provision shall be included.

(l) Electrical power shall be available at the plant site.

R309-530-7. Diatomaceous Earth Filtration.

The use of Diatomaceous Earth Filtration units may be considered for application to surface waters with low turbidity and low bacterial contamination, and additionally may be used for iron removal for groundwaters of low quality, providing the removal is effective and the water is of sanitary quality

before treatment.

The acceptability of Diatomaceous Earth Filtration as a substitute for "conventional surface water treatment" facilities (detailed in rule R309-525) shall be determined by the Director. Determination may be based on the level of support previously exhibited by the public water system management along with a finding by the Director that "conventional surface water treatment" or other methods herein described are too costly or unacceptable.

Diatomaceous Earth Filtration consists of a process to remove particles from water wherein a precoat cake of diatomaceous earth filter media is deposited on a support membrane (septum), and while the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the source water to maintain the permeability of the filter cake. Diatomite filters are characterized by rigorous operating requirements, high operating costs, and increased sludge production.

Part 4, Section 4.2.3, Diatomaceous Earth Filtration, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 edition is hereby incorporated by reference and compliance with those standards shall be required for the design and operation of diatomaceous earth filtration facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-530-8. Membrane Technology.

(1) Acceptability.

Surface waters, or groundwater under the direct influence of surface water (UDI), may be treated using membrane technology (microfiltration, ultrafiltration, nanofiltration) coupled with "primary and secondary disinfection."

(2) Pilot Plant Study.

Because this is a relatively new technology, appropriate investigation shall be conducted by the public water system to assure that the process will produce the required quality of water at a cost which can be borne by the public water system consumers. A pilot plant study shall be conducted prior to the commencement of design. The study must be conducted in accordance with EPA's Environmental Technology Verification Program (ETV) or the protocol and treated water parameters must be approved prior to conducting any testing by the Director.

(3) Design Requirements.

The following items shall be addressed in the design of any membrane technology plant intended to provide microbiological treatment of surface waters or groundwater "UDI:"

(a) The facility shall be equipped with an on-line particle counter on the final effluent.

(b) The facility shall be equipped with an automatic membrane integrity test system.

(4) The Director shall establish the turbidity limit for 95% of turbidity measurements and the maximum turbidity limit which shall not be exceeded. The plant effluent shall meet the requirements of R309-200-5(5)(a)(ii).

R309-530-9. New Treatment Processes or Equipment.

The policy of the Board is to encourage, rather than to obstruct, the development of new methods and equipment for the treatment of water. Nevertheless, any new processes or equipment must have been thoroughly tested in full-scale, comparable installations, before approval of plans can be issued. Refer to EPA's Environmental Technology Verification Program (ETV).

No new treatment process will be approved for use in Utah unless the designer or supplier can present evidence satisfactory to the Director that the process will insure the delivery of water of safe, sanitary quality, without imposing undue problems of supervision, operation and/or control.

The Director shall establish the turbidity limit for 95% of turbidity measurements and the maximum turbidity limit which shall not be exceeded. The plant effluent shall meet the requirements of R309-200-5(5)(a)(ii).

Guidance: Any municipality, water district, or institution purchasing novel equipment shall be amply protected by a performance bond or other acceptable arrangement, so that any expenditure of money will be refunded in case of failure of any process or equipment. The performance bond shall include provisions to cover the cost of any alterations deemed necessary by the Director.

KEY: drinking water, direct filtration, slow sand filtration, membrane technology
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R309-535. Facility Design and Operation: Miscellaneous Treatment Methods.

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R309-535. Facility Design and Operation: Miscellaneous Treatment Methods.

R309-535-1. Purpose.

The purpose of this rule is to provide specific requirements for miscellaneous water treatment methods which are primarily intended to remove chemical contaminants from drinking water; or, adjust the chemical composition of drinking water. It is intended to be applied in conjunction with other rules, specifically R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-535-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-535-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-535-4. General.

For each process described in this section pertinent rules are given. The designer must also, however, incorporate the relevant rules given in other sections into the plans and specifications for any of these specialized treatment methods. Where applicable, the following topics must be addressed:

(1) Plant Siting (see R309-525-6).

(2) Plant Reliability (see R309-525-7).

(3) Color Coding and Pipe Marking (see R309-525-8).

(4) Chemical Addition (see R309-525-11).

(5) Miscellaneous Plant Facilities (see R309-525-17, particularly sub-section R309-525-17(1), Laboratory).

(6) Operation and Maintenance Manuals (see R309-525-19).

(7) Safety (see R309-525-21).

(8) Disposal of Treatment Plant Waste (see R309-525-23).

(9) Disinfection (see R309-520).

R309-535-5. Fluoridation.

Sodium fluoride, sodium silicofluoride and fluorosilicic acid shall conform to the applicable AWWA standards and/or ANSI/NSF Standard 60. Other fluoride compounds which may be available must be approved by the Director.

(1) Fluoride compound storage.

Fluoride chemicals shall be isolated from other chemicals to prevent contamination. Compounds shall be stored in covered or unopened shipping containers and shall be stored inside a building. Unsealed storage units for fluorosilicic acid shall be vented to the atmosphere at a point outside any building. Bags, fiber drums and steel drums shall be stored on pallets.

(2) Chemical feed equipment and methods.

In addition to the requirements in R309-525-11 "Chemical Addition", fluoride feed equipment shall meet the following requirements:

(a) scales, loss-of-weight recorders or liquid level indicators, as appropriate, accurate to within five percent of the average daily change in reading shall be provided for chemical feeds,

(b) feeders shall be accurate to within five percent of any desired feed rate,

(c) fluoride compound shall not be added before lime-soda softening or ion exchange softening,

(d) the point of application of fluorosilicic acid, if into a horizontal pipe, shall be in the lower half of the pipe,

(e) a fluoride solution shall be applied by a positive displacement pump having a stroke rate not less than 20 strokes per minute,

(f) a spring opposed diaphragm type anti-siphon device shall be provided for all fluoride feed lines and dilution water lines,

(g) a device to measure the flow of water to be treated is required,

(h) the dilution water pipe shall terminate at least two pipe diameters above the solution tank,

(i) water used for sodium fluoride dissolution shall be softened if hardness exceeds 75 mg/l as calcium carbonate,

(j) fluoride solutions shall be injected at a point of continuous positive pressure or a suitable air gap provided,

(k) the electrical outlet used for the fluoride feed pump shall have a nonstandard receptacle and shall be interconnected with the well or service pump,

(l) saturators shall be of the upflow type and be provided with a meter and backflow protection on the makeup water line.

(m) lead weights shall not be used in fluoride chemical solutions to keep pump suction lines at the bottom of a day or bulk storage tank.

(3) Secondary controls.

Secondary control systems for fluoride chemical feed devices shall be provided as a means of reducing the possibility for overfeed; these may include flow or pressure switches or other devices.

(4) Protective equipment.

Personal protective equipment as outlined in R309-525-11(10) shall be provided for operators handling fluoride compounds. Deluge showers and eye wash devices shall be provided at all fluorosilicic acid installations.

(5) Dust control.

(a) Provision must be made for the transfer of dry fluoride compounds from shipping containers to storage bins or hoppers in such a way as to minimize the quantity of fluoride dust which may enter the room in which the equipment is installed. The enclosure shall be provided with an exhaust fan and dust filter which place the hopper under a negative pressure. Air exhausted from fluoride handling equipment shall discharge through a dust filter to the outside atmosphere of the building.

(b) Provision shall be made for disposing of empty bags, drums or barrels in a manner which will minimize exposure to fluoride dusts. A floor drain shall be provided to facilitate the hosing of floors.

(6) Testing equipment.

Equipment shall be provided for measuring the quantity of fluoride in the water. Such equipment shall be subject to the approval of the Director.

R309-535-6. Taste and Odor Control.

Part 4, Section 4.9, Taste and Odor Control, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 edition is hereby incorporated by reference and compliance with those standards shall be required for the design and operation of taste and odor control facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-7. Stabilization.

Part 4, Section 4.8, Stabilization, in the Recommended Standards for Water Works (commonly

known as "Ten State Standards"), 2007 edition is hereby incorporated by reference and compliance with those standards shall be required for the design and operation of stabilization facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-8. Deionization.

Current practical methods of deionization include Ion Exchange, Reverse Osmosis and Electrodialysis. Additional methods of deionization may be approved subject to the presentation of evidence of satisfactory reliability.

All properly developed groundwater sources having water quality exceeding 2,000 mg/l Total Dissolved Solids and/or 500 mg/l Sulfate shall be either properly diluted or treated by the methods outlined in this section. Deionization cannot be considered a substitute process for conventional complete treatment outlined in R309-525.

(1) Ion Exchange.

(a) General.

Great care shall be taken by the designer to avoid loading the media with water high in organics.

(b) Design.

(i) Pretreatment shall be provided per the manufacturer's recommendation.

(ii) Upflow or down flow units are acceptable.

(iii) Exchangers shall have at least a three foot media depth.

(iv) Exchangers shall be designed to meet the recommendations of the media manufacturer with regard to flow rate or contact time. In any case, flow shall not exceed seven gpm/sf of bed area. The plant shall be provided with an influent or effluent meter as well as a meter on any bypass line.

(v) Chemical feeders used shall conform with R309-525-8. All solution tanks shall be covered.

(vi) Regenerants added shall be uniformly distributed over the entire media

surface of upflow or downflow units. Regeneration shall be according to the media manufacturer's recommendations.

(vii) The wash rate capability shall be in excess of the manufacturer's recommendation and shall be at least six to eight gpm/sf of bed area.

(viii) Disinfection (see R309-520) shall be required ahead of the exchange units where this does not interfere with the media.

Where disinfection interferes with the media, disinfection shall follow the treatment process.

(c) Waste Disposal.

Waste generated by ion exchange treatment shall be disposed of in accordance with R309-525-23.

(2) Reverse Osmosis.

(a) General.

The design shall permit the easy exchange of modules for cleaning or replacement.

(b) Design Criteria.

(i) Pretreatment shall be provided per the manufacturer's recommendation.

(ii) Required equipment includes the following items: pressure gauges on the upstream and downstream side of the filter; a conductivity meter present at the site; taps for sampling permeate, concentrate and blended flows (if practiced). If a continuous conductivity meter is permanently installed, piping shall be such that the meter can be disconnected and calibrated with standard solutions at a frequency as recommended by the manufacturer.

(iii) Aeration, if practiced, shall conform with provisions of R309-535-9.

(iv) Cleaning shall be routinely done in accordance with the manufacturer's recommendations.

(v) Where the feed water pH is altered, stabilization of the finished water is mandatory.

(c) Waste Disposal.

Waste generated by reverse osmosis treatment shall be disposed of in accordance with R309-525-23.

(3) Electrodialysis.

(a) General.

(b) Design.

(i) Pretreatment shall be provided per the manufacturers recommendation.

(ii) The design shall include ability to: measure plant flow rates; measure feed temperature if the water is heated (a high temperature automatic cutoff is required to prevent membrane damage); measure D.C voltage at the first and second stages as well as on each of the stacks. Sampling taps shall be provided to measure the conductivity of the feed water, blowdown water, and product water. D.C. and A.C. kilowatt-hour meters to record the electricity used shall also be provided.

(c) Waste Disposal.

Waste generated by electrodialysis treatment shall be disposed of in accordance with R309-525-23.

R309-535-9. Aeration.

Part 4, Section 4.5, Aeration, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 edition, is hereby incorporated by reference and compliance with those standards shall be required for the design and operation of aeration facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-10. Softening.

Part 4, Section 4.4, Softening, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 edition, is hereby incorporated by reference and

compliance with those standards shall be required for the design and operation of softening facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-11. Iron and Manganese Control.

Iron and manganese control, as used herein, refers solely to treatment processes designed specifically for this purpose. The treatment process used will depend upon the character of the source water. The selection of one or more treatment processes shall meet specific local conditions as determined by engineering investigations, including chemical analyses of representative samples of water to be treated, and receive approval of the Director. It may be necessary to operate a pilot plant in order to gather all information pertinent to the design. Consideration shall be given to adjust the pH of the raw water to increase the rate of the chemical reactions involved.

Removal or treatment of iron and manganese are normally by the following methods:

(1) Removal by Oxidation, Detention and Filtration.

(a) Oxidation.

Oxidation may be by aeration, or by chemical oxidation with chlorine, potassium permanganate, ozone or chlorine dioxide.

(b) Detention.

(i) Reaction time - A minimum detention time of twenty minutes shall be provided following aeration in order to insure that the oxidation reactions are as complete as possible. This minimum detention may be omitted only where a pilot plant study indicates no need for detention. The detention basin shall be designed as a holding tank with no provisions for sludge collection but with sufficient baffling to prevent short circuiting.

(ii) Sedimentation - Sedimentation basins shall be provided when treating water with high iron and/or manganese content, or where chemical coagulation is used to reduce the load on the filters. Provisions for sludge removal shall be made.

(c) Filtration.

(i) General - Minimum criteria relative to number, rate of filtration, structural details and hydraulics, filter media, etc., provided for rapid rate gravity filters shall apply to pressure filters where appropriate, and may be used in this application but cannot be used in the filtration of surface waters or following lime-soda softening.

(ii) Details of Design for Pressure Filter - The filters shall be designed to provide for:

(A) Loss of head gauges on the inlet and outlet pipes of each filter,

(B) An easily readable meter or flow indicator on each battery of filters,

(C) Filtration and backwashing of each filter individually with an arrangement of piping as simple as possible to accomplish these purposes,

(D) The top of the washwater collectors to be at least twenty-four (24) inches above the surface of the media,

(E) The underdrain system to efficiently collect the filtered water and to uniformly distribute the backwash water at a rate capable of not less than 15 gpm/sf of filter area,

(F) Backwash flow indicators and controls that are easily readable while operating the control valves,

(G) An air release valve on the highest point of each filter,

(H) An accessible manhole to facilitate inspections and repairs,

(I) Means to observe the wastewater and filters during backwashing, and

(J) Construction to prevent cross-connection.

(2) Removal by the Lime-soda Softening Process.

For removal by the lime-soda softening process refer to Part 4,

Section 4.4, Softening, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 edition as indicated in R309-535-10. Those standards are hereby incorporated by reference and compliance with those standards shall be required for removal by the lime-soda softening process.

(3) Removal by Manganese Greensand Filtration.

This process, consisting of the continuous feed of potassium permanganate to the influent of a manganese greensand filter, is more applicable to the removal of manganese than the removal of iron.

(a) Provisions shall be made to apply the permanganate as far ahead of the filter as practical and at a point immediately before the filter.

(b) An anthracite media cap of at least six inches shall be provided over manganese greensand.

(c) The normal filtration rate is three gpm/sf.

(d) The normal wash rate is 8 to 10 gpm/sf.

(e) Air washing shall be provided.

(f) Sample taps shall be provided:

(i) prior to application of permanganate,

(ii) immediately ahead of filtration,

(iii) at a point between the anthracite media and the manganese greensand,

(iv) halfway down the manganese greensand, and

(v) at the filter effluent.

(4) Removal by Ion Exchange.

This process is not acceptable where either the source water or wash water contains dissolved oxygen.

(5) Sequestration by Polyphosphates.

This process shall not be used when iron, manganese or a combination thereof exceeds 1.0 milligram per liter. The total phosphate applied shall not exceed 10 milligrams per liter as PO4. Where phosphate treatment is used, satisfactory chlorine residuals shall be maintained in the distribution system and the following required:

(a) feeding equipment shall conform to the requirements of R309-525-11(7),

(b) stock phosphate solution shall be kept covered and disinfected by carrying approximately 10 mg/l free chlorine residual,

(c) polyphosphates shall not be applied ahead of iron and manganese removal treatment. If no iron or manganese removal treatment is provided, the point of application shall be prior to any aeration, oxidation or disinfection steps, and

(d) phosphate chemicals must comply with ANSI/NSF Standard 60.

Sampling taps shall be provided for control purposes. Taps shall be located on each raw water source, and on each treatment unit influent and effluent.

Waste generated by iron and manganese control treatment shall be disposed of in accordance with R309-525-23.

R309-535-12. Point-of-Use and Point-of-Entry Treatment Devices.

Where drinking water does not meet the quality standards of R309-200 and the available water system treatment methods are determined to be unreasonably costly or otherwise undesirable, the Director may permit the public water supplier to install and maintain point-of-use or point-of-entry treatment devices. This approval shall only be given after receipt and satisfactory review of the following items.

(1) The Director shall only consider approving point-of-use or point-of-entry treatment upon receipt of an analysis that clearly demonstrates that central treatment is not feasible for the public water system. Unless waived by the Director, this analysis shall be in the form of an engineering report prepared by a professional engineer registered in the State of Utah. Systems serving fewer than 75 connections are excused from performing an analysis by a Registered Professional Engineer.

(2) The water system shall have a signed access agreement with each customer that allows water system personnel to enter their property on a scheduled basis to install and maintain

the treatment devices. The agreement shall include educational information with regard to the health risks of consuming or cooking with water from non-treated taps. Systems with an initial 75% of their connections under a signed access agreement shall be allowed to proceed with the understanding that 100% of their connections are due within a 5 year period. For public water systems that own or control all connections to the public water system, this requirement will not apply.

(3) Documentation that legal authority, which includes a termination of service clause, has been adopted to ensure water system access to the property for installation, maintenance, servicing and sampling of each treatment unit. For public water systems that own or control all connections to the public water system, this requirement will not apply.

(4) Point-of-use or point-of-entry treatment devices used shall only be those proven to be appropriate, safe and effective as determined through testing and compliance with protocols established by EPA's Environmental Technology Verification Program (ETV) or the applicable ANSI/NSF Standard(s). A pilot study may be required to determine the suitability of the point-of-use or point-of-entry device in treating a particular source water. The scope and duration of the pilot study shall be determined by such factors as the characteristics of the raw water, manufacturer's ratings of the treatment device, and good engineering practices. The pilot study will generate data on service intervals, aid in specifying and calibrating alarm systems, and reveal any site specific problems with component fouling or microbial colonization.

(5) The water system shall provide an operation and maintenance plan demonstrating that the treatment units shall be installed and serviced in accordance with the manufacturer's instructions and that compliance sampling as required in R309-215-6 shall take place. The system shall provide documentation of an operation and maintenance contract or schedule annually as required in R309-105-16(4). If the operation and maintenance of the POU/POE devices is performed by water system personnel, it shall only be performed by a water operator certified at the level of the water system.

(6) The performance indicating device for the point-of-use/point-of-entry treatment device that will be used shall be specified in the submital for plan approval.

(7) The water system shall submit a customer education and out-reach plan that includes at a minimum annual frequency of contact.

(8) Point-of-use or point-of-entry treatment devices for compliance with the nitrate MCL shall only be considered if treatment is provided at all taps that are accessible to the public.

R309-535-13. New Treatment Processes or Equipment.

The policy of the Board is to encourage, rather than to obstruct, the development of new methods and equipment for the treatment of water. Nevertheless, any new processes or equipment must have been thoroughly tested in full-scale, comparable installations, before approval of plans can be issued. The U.S. Environmental Protection Agency (EPA) has created the Environmental Technology Verification (ETV) Program to facilitate the deployment of innovative or improved environmental technologies through performance verification and dissemination of information. NSF International (NSF) in cooperation with the EPA operates the Package Drinking Water Treatment Systems (PDWTS) pilot, one of 12 technology areas under ETV. Engineers and Manufacturers are referred to Manager, ETV project, NSF International, P.O. Box 130140, Ann Arbor, Michigan 48113-0140.

No new treatment process will be approved for use in Utah unless the designer or supplier can present evidence satisfactory to the Director that the process will insure the delivery of water of safe, sanitary quality, without imposing undue problems of supervision, operation and/or control.

KEY: drinking water, miscellaneous treatment, stabilization, iron and manganese control
Date of Enactment or Last Substantive Amendment: August 28, 2013
Notice of Continuation: March 22, 2010
Authorizing, and Implemented or Interpreted Law: 19-4-104

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R309-540 Facility Design and Operation: Pump Stations

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R309-540. Facility Design and Operation: Pump Stations.

R309-540-1. Purpose.

The purpose of this rule is to provide specific requirements for pump stations utilized to deliver drinking water to facilities of public water systems. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-540-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63G-3 of the same, known as the Administrative Rulemaking Act.

R309-540-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-540-4. General.

Pumping stations shall be designed to maintain the sanitary quality of water and to provide ample quantities of water at sufficient pressure.

R309-540-5. Pumping Facilities.

(1) Location.

(a) The pumping station shall be designed such that:

(i) the proposed site will meet the requirements for sanitary protection of water quality, hydraulics of the system, and protection against interruption of service by fire, flood or any other hazard;

Guidance: Subsurface pits or pump rooms and inaccessible installations shall be avoided.

(ii) the access to the pump station shall be six inches above the surrounding ground and the v station located at an elevation which is a

minimum of three feet above the 100-year flood elevation, or three feet above the highest recorded flood elevation, which ever is higher, or protected to such elevations;

(iii) the station is readily accessible at all times unless permitted to be out of service for the period of inaccessibility;

(iv) surrounding ground is graded so as to lead surface drainage away from the station; and

(v) the station is protected to prevent vandalism and entrance by animals or unauthorized persons.

(2) Pumping Stations.

(a) Building structures for both raw and drinking water shall:

(i) have adequate space for the installation of additional pumping units if needed, and for the safe servicing of all equipment;

(ii) be of durable construction, fire and weather resistant, with outward-opening doors;

(iii) have an interior floor elevation at least six inches above the exterior finished grade;

(iv) have any underground facilities, especially wet wells, waterproofed;

(v) have all interior floors drained in such a manner that the quality of drinking water contained in any wet wells will not be endangered. All floors shall slope at least one percent (one foot every 100 feet) to a suitable drain; and provide a suitable outlet for drainage from pump glands without discharging onto the floor.

(b) Suction wells shall:

(i) be watertight;

(ii) have floors sloped to permit removal of water and entrained solids;

(iii) be covered or otherwise protected against contamination; and

(iv) have two pumping compartments or other means to allow the suction well to be taken out of service for inspection, maintenance, or repair.

(c) Servicing equipment shall consist of:

(i) crane-ways, hoist beams, eyebolts, or other adequate facilities for servicing or removal of pumps, motors or other heavy equipment;

(ii) openings in floors, roofs or wherever else needed for removal of heavy or bulky equipment; and

(iii) a convenient tool board, or other facilities as needed, for proper maintenance of the equipment.

(d) Stairways and ladders shall:

(i) be provided between all floors, and in pits or compartments which must be entered; and

(ii) have handrails on both sides, and treads of non-slip material. They shall have risers not exceeding nine inches and treads wide enough for safety.

Guidance: Ramps are preferred in areas where there is frequent traffic or where supplies are transported by hand. Stairs, where ramps are not possible, and ladders as a last choice.

(e) Heating provisions shall be adequate for:

(i) the comfort of the operator; and

(ii) the safe and efficient operation of the equipment.

Guidance: In pump hoses not occupied by personnel, only enough heat need be provided to prevent freezing of equipment or treatment process.

(f) Ventilation shall:

(i) conform to existing local and/or state codes; and

(ii) forced ventilation of at least six changes of air per hour shall be provided for all rooms, compartments, pits and other enclosures below ground floor, and any area where unsafe atmosphere may develop or where excessive heat may be built up.

Guidance: In areas where excess moisture could cause hazards to safety or damage to equipment , means for dehumidification shall be provided.

(g) Lighting.

Pump stations shall be adequately lighted throughout. All electrical work shall conform to the requirements of the relevant state and/or local building codes.

(h) Sanitary and other conveniences.

Plumbing shall be so installed as to prevent contamination of a public water supply. Wastes shall be discharged in accordance with the plumbing code, R317-

4, or R317-1-3.

Guidance: All pumping stations that are manned for extended periods shall be provided with potable water, lavatory and toilet facilities.

(3) Pumps.

(a) Capacity.

Capacity shall be provided such that the pump or pumps shall be capable of providing the peak day demand of the system or the specific portion of the system serviced.

The pumping units shall:

(i) have ample capacity to supply the peak day demand against the required distribution system pressure without dangerous overloading;

(ii) be driven by prime movers able to meet the maximum horsepower condition of the pumps without use of service factors;

(iii) be provided readily available spare parts and tools; and

(iv) be served by control equipment that has proper heater and overload protection for air temperature encountered.

(b) Suction Lift.

Suction lift, where possible, shall be avoided. If suction lift is necessary, the required lift shall be within the pump manufacturer's recommended limits and provision shall be made for priming the pumps.

(c) Priming.

Prime water shall not be of lesser sanitary quality than that of the water being pumped. Means shall be provided to prevent back siphonage. When an air-operated ejector is used, the screened intake shall draw clean air from a point at least 10 feet above the ground or other source.

Guidance: Vacuum priming may be used.

(4) Booster Pumps.

(a) Booster pumps shall be located or controlled so that:

(i) they will not produce negative pressure in their suction lines;

(ii) automatic cutoff pressure shall be at least 10 psi in the suction line;

(iii) automatic or remote control devices shall have a range between the start and cutoff pressure which will prevent excessive cycling; and

(iv) a bypass is available.

(b) Inline booster pumps (pumps withdrawing water directly from distribution lines without the benefit of storage and feeding such water directly into other distribution lines rather than storage), in addition to the other requirements of this section, shall have at least two pumping units (such that with any one pump out of service, the remaining pump or pumps shall be capable of providing the peak day demand of the specific portion of the system serviced), shall be accessible for servicing and repair and located or controlled so that the intake pressure shall be at least 20 psi when the pump or pumps are in normal operation.

Guidance: All booster pumping stations shall contain a totalizer meter.

(d) Individual home booster pumps shall not be allowed for any individual service from the public water supply main.

Guidance: Public water systems are responsible to adequately design and maintain their systems in order to deliver an adequate quantity of clean, safe, drinking water to their customers while maintaining certain minimum pressures at all times, including peak demands (see R309-105-9).

Public water systems are being required to develop and operate a program to protect their systems from backflow or backsiphonage. An individual home booster pump, if installed such that the suction side of the pump draws directly from the system's water main rather than through an intermediate holding tank, may reduce the pressure in the main to less than 20 psi (perhaps even creating a vacuum), thereby increasing the potential for contaminated water to enter the distribution system through any minor undetected leaks that may exist.

We cannot regulate the individual homeowner, but we do not want to encourage public water systems to proliferate the use of such pumps. Rule R309-105-6(2)(b) ("exceptions") will still be available for individual cases where there is no other acceptable alternative, but each public water system shall review language included in their service agreements with customers and perhaps modify such as needed to make it clear to the homeowner and any plumbing inspector that such pumps are not allowed, even if stated otherwise by the Plumbing Code, without the permission of the supplier and authorized by the Director.

(5) Automatic and remote controlled stations.

All remote controlled stations shall be electrically operated and controlled and shall have signaling apparatus of proven performance. Installation of electrical equipment shall conform with the applicable state and local electrical codes and the National Electrical Code.

Guidance: All automatic stations shall be provided with automatic signaling apparatus which will report when the station is out of service.

(6) Appurtenances.

(a) Valves.

Valves shall be used to permit satisfactory operation, maintenance, and repair of the equipment. If foot valves are necessary, they shall have a net valve area of at least 2 1/2 times the area of the suction pipe and they shall have a positive-acting check valve on the discharge side between the pump and the shut-off valve.

(b) Piping.

Piping within and near pumping stations shall:

(i) be designed so that the friction losses will be minimized;

(ii) not be subject to contamination;

(iii) have watertight joints;

(iv) be protected against surge or water hammer; and

(v) be such that each pump has an individual suction line or that the lines shall be so manifolded that they will insure similar hydraulic and operating conditions.

(c) Gauges and Meters.

Each pump shall:

(i) have a standard pressure gauge on its discharge line;

(ii) Have a compound gauge (capable of indicating negative pressure or vacuum as well as positive pressure) on its suction line; and

(iii) have recording gauges in the larger stations.

Guidance: Pumping stations shall have a means for measuring the discharge. The station shall have indicating, totalizing, and recording metering of the total water pumped.

(d) Water Seal.

Where pumps utilize water seals, the seals shall:

(i) not be supplied with water of a lesser sanitary quality than that of the water being pumped; and

(ii) when pumps are sealed with potable water and are pumping water of lesser sanitary quality, the seal shall be provided with a break tank open to atmospheric pressure, and have an air gap of at least six inches or two pipe diameters, whichever is greater, between the feeder line and the spill line of the tank.

(e) Controls.

Controls shall be designed in such a manner that they will operate their prime movers, and accessories, at the rated capacity without dangerous overload. Where two or more pumps are installed, provision shall be made for alternation. Provision shall be made to prevent energizing the motor in the event of a backspin cycle. Electrical controls shall be protected against flooding. Equipment shall be provided or other arrangements made to prevent surge pressures from activating controls which switch on pumps or activate other equipment outside the normal design cycle of operation.

(f) Standby Power.

Standby power, to ensure continuous service when the primary power has been interrupted, shall be provided from at least two independent sources or a standby or an auxiliary source shall be provided. If standby power is provided by onsite generators or engines, the fuel storage and fuel line must be designed to protect the water supply from contamination.

Guidance: Because of the potential for contamination from leaking gasoline or diesel fuel tans, auxilliary on-site generators fueled by natural gas or bottled gas are preferred.

(g) Water Pre-Lubrication.

When automatic pre-lubrication of pump bearings is necessary and an auxiliary direct drive power supply is provided, the pre-lubrication line shall be provided with a valved bypass around the automatic control so that the bearings can, if necessary, be lubricated manually before the pump is started or the pre-lubrication controls shall be wired to the auxiliary power supply.

R309-540-6. Hydropneumatic Systems.

(1) General.

Hydropneumatic systems shall comply with all appropriate sections of R309-540-5 except as otherwise indicated herein.

Unpressurized ground level or elevated storage, designed in accordance with R309-545, shall be provided for community type public water systems or non-transient non-community systems where a demand in excess of the capacity of the source(s) is required, in addition to the diaphragm or air tanks. Diaphragm or air pressure tank storage shall not be considered for fire protection purposes or effective system storage for community type systems.

(2) Location.

If diaphragm or air tanks and appurtenances are located below ground, adequate provisions for drainage, ventilation, maintenance, and flood protection shall be made and the electrical controls shall be located above grade so as to be protected from flooding as required by R309-540-5(6)(e). Any discharge piping from combination air release/vacuum relief valves(air/vac's) or pressure relief valves located in below ground chambers shall comply with all the pertinent requirements of R309-550-6(6).

Guidance: The pressure tanks and appurtenances shall be located above normal ground surface and be completely housed.

Guidance: The pressure tank or tanks and appurtenances may be separated.

(3) Operating Pressures.

The system shall be designed to provide minimum pressures in R309-105-9 at all points in the distribution system. A pressure gauge shall be installed on the pressure tank inlet line.

(4) Piping.

In addition to the bypass required by R309-540-5(4)(iv) on the pumps, the diaphragm or air tanks shall have sufficient bypass piping to permit operation of the hydropneumatic system while one or more of the tanks are being repaired, replaced or painted.

(5) Pumps.

At least two pumping units shall be provided except for those type systems not requiring unpressurized storage in R309-540-6(1); they may use the pump within their groundwater source to pressurize the diaphragm or air tanks. With any pump out of service the remaining pump or pumps shall be capable of providing the peak instantaneous demand of the system as described in R309-510-9(2), while recharging the pressure tank at 115 percent of the upper pressure setting. Pump cycling shall not exceed 15 starts per hour,

with a maximum of ten starts per hour preferred.

Guidance: If the water system can be conveniently shut down (e.g.as in some non-community systems) one pump may be sufficient if approved by the Director.

(6) Pressure Tanks.

(a) Pressure tanks shall meet the requirement of state and local laws and regulations for the manufacture and installation of unfired pressure vessels. Interior coatings or diaphragms used in pressure tanks that will come into contact with the drinking water shall comply with ANSI/NSF Standard 61. Non diaphragm pressure tanks shall have an access manhole, a drain, control equipment consisting of pressure gauge, water sight glass, automatic or manual air blow-off, means for adding air, and pressure operated start-stop controls for the pumps.

Guidance: Sizing of hydropneumatic systems storage tanks, both unpressurized and pressure tanks, shall consider the need for disinfectant detention time, as applicable, independant of the requirements of this section.

Guidance: Where practical the access manhole shall be a minimum 24 inches in diameter.

(b) The minimum volume of the pressure tank or combination of tanks shall be greater than or equal to the sum of S and the value of CX divided by 4W.

Guidance: Volume (min) > = S + CX/4W

where the following values are used in the equation above:

C = minutes per operating cycle, four minutes to meet the requirements of R309-540-6(5) above or preferably six minutes, and is equal to pump ON time plus pump OFF time.

X = output capacity rating of the pump(s) at the high pressure condition in the tank(s), in gpm.

W = percent of volume withdrawn during a given drop in tank pressure: specifically, between P_h and P_l. $W = 100(P_h - P_l)/P_h$ where P_h = high pressure in tank in psia (high absolute pressure) and P_l = low pressure in tank is psia (low absolute pressure). Values of W range typically from 0.26 to 0.31 for pressure differentials of 15 to 30 psi and high system pressures of 45 to 85 psi at elevations of approximately 5,000 feet.

S = water seal volume in gallons, the volume of inactive water remaining in tank at low pressure condition.

Guidance: As a rule-of-thumb the minimum volume (gallonage) of the

hydropneumatic tank shall be at least five times the capacity of the pump(s), rated in gpm. For example, a 200 gpm pump or combination of pumps shall have a 1,000 gallon pressure tank.

(7) Air Volume.

The method of adjusting the air volume shall be acceptable to the Director. Air delivered by compressors to the pressure tank shall be adequately filtered, oil free, and be of adequate volume. Any intake shall be screened and draw clean air from a point at least 10 feet above the ground or other source of possible contamination, unless the air is filtered by an apparatus approved by the Director. Discharge piping from air relief valves shall be designed and installed with screens to eliminate the possibility of contamination from this source.

(8) Water Seal.

For air pressure tanks without an internal diaphragm the volume of water remaining in a air pressure tank at the lower pressure setting shall be sufficient to provide an adequate water seal at the outlet to prevent the leakage of air.

Guidance: To prevent the formation of a vortex, a covering baffle may be installed over a vertical bottom outlet large enough to limit the peripheal velocity of approach to the baffle to 0.5 ft/sec of less. At low absolute pressure the depth of water over the top of the baffle shall be about one outlet pipe velocity head or greater. For either horizontal or vertical outlets, the pipe outlet itself shall be large enough to limit the maximum axial velocity in the pipe to 4.0 ft/sec or less. The use of anti-swirl vanes is always desirable.

The following water seal depths shall be considered as minimum requirements.

(a) Horizontal outlets shall maintain sufficient depth, as measured from the centerline of the horizontal outlet pipe, such that the depth is greater than or equal to the sum of d and twice the value v^2 divided by 2G.

(b) Vertical outlets, if unbaffled, the depth shall be the same as in (a) except measured from the pipe outlet; if baffled, the depth shall be greater than or equal to the value v2 divided by 2G.

where the following values are used in the equations above:

v = the axial velocity in the pipe outlet for the peak instantaneous demand flow rate of the system.

d = the diameter of the outlet pipe in ft.

G = the gravitational constant of 32.2 ft/sec/sec.

Guidance: The axial velocity in the pipe outlet shall not exceed 4.0 ft/sec.

(9) Standby Power Supply.

Where a hydropneumatic system is intended to serve a public water system, categorized as a community water system as defined in R309-110, a standby source of power shall be provided.

KEY: drinking water, pumps, hydropneumatic systems, individual home booster pumps
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R309-545 Facility Design and Operation: Drinking Water Storage Tanks

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R309-545. Facility Design and Operation: Drinking Water Storage Tanks.

R309-545-1. Purpose.

The purpose of this rule is to provide specific requirements for public drinking water storage tanks. It is intended to be applied in conjunction with other rules, specifically R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-545-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-545-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-545-4. General.

Storage for drinking water shall be provided as an integral part of each public drinking water system unless an exception to rule is approved by the Director. Pipeline volume in transmission or distribution lines shall not be considered part of any storage volumes.

R309-545-5. Size of Tank(s).

Required Storage Capacity: In the absence of firm water use data, at or above the 90% confidence level, storage tanks shall be sized in accordance with the required minimums of R309-510.

Guidance: The storage requirements in R309-510 may be reduced or eliminated when the source and any treatment facility have sufficient capacity and reliability (e.g. dual pumps, standby power, etc.) to serve the peak hourly demands of the system plus fire flows. A request for an exception from rule, as described in R309-105-6(2)(b), shall be submitted along with records supporting the request and the exception approved, in writing, by the Director before storage can be reduced or eliminated.

R309-545-6. Tank Material and Structural Adequacy.

(1) Materials.

The materials used in drinking water storage structures shall provide stability and durability as well as protect the quality of the stored water. Steel tanks shall be constructed from new, previously unused, plates and designed in accordance with AWWA Standard D-100.

(2) Structural Design.

The structural design of drinking water storage structures shall be sufficient for the environment in which they are located. The design shall incorporate a careful analysis of potential seismic risks.

Guidance: Division review of plans and specifications for storage tanks does not include an evaluation of structural suitability. Certificate of structural adequacy may be requested from the design engineer before approval is granted.

R309-545-7. Location of Tanks.

(1) Pressure Considerations.

The location of the reservoir and the design of the water system shall be such that the minimum working pressure in the distribution system shall meet the minimum pressures as required in R309-105-9.

Guidance: The normal working pressure shall be between 40 and 60 psi. When static pressures exceed 80 psi, pressure reducing devices shall be provided on mains in the distribution system, or individual home pressure reducing valves shall be installed per the Utah Plumbing Code. The expected water level variation in the tank shall be taken into account when considering minimum and maximum distribution system pressures.

(2) Connections.

Tanks shall be located at an elevation where present and anticipated connections can be adequately served. System connections shall not be placed at elevations such that minimum pressures as required in R309-105-9 cannot be continuously maintained.

(3) Sewer Proximity.

Sewers, drains, standing water, and similar sources of possible contamination shall be kept at least 50 horizontal feet from the reservoir.

(4) Standing Surface Water.

The area surrounding a ground-level drinking water storage structure shall be graded in a manner that will prevent surface water from standing within 50 horizontal feet of the

structure.

(5) Ability to Isolate.

Drinking water storage structures shall be designed and located so that they can be isolated from the distribution system. Storage structures shall be capable of being drained for cleaning or maintenance without necessitating loss of pressure in the distribution system.

Guidance: It is recommended that any discharge lines from tank overflow or drains be sloped for complete drainage so as to prevent any standing water in these lines. It is also recommended that these lines be separate from each other as well as separate from other discharge lines, such as from perimeter french drain system, and each be easily visible as required for the overflow line.

(6) Earthquake and Landslide Risks.

Potential geologic hazards shall be taken into account in selecting a tank location. Earthquake and landslide risks shall be evaluated.

Guidance: The design may include special shut-off or isolation valves designed to react in the event of an earthquake.

(7) Security.

The site location and design of a drinking water storage reservoir shall take into consideration security issues and potential for vandalism.

R309-545-8. Tank Burial.

(1) Flood Elevation.

The bottom of drinking water storage reservoirs shall be located at least three feet above the 100 year flood level or the highest known maximum flood elevation, whichever is higher.

Guidance: The bottom shall be placed at the normal ground surface when ever possible.

(2) Ground Water.

When the bottom of a drinking water storage reservoir is to be below normal ground surface, it shall be placed above the local ground water table elevation.

Guidance: It is recommended that a french drain system be considered around any buried storage tank, but especially if the ground water table elevation is unknown or may exhibit seasonal variations.

(3) Covered Roof.

When the roof of a drinking water storage reservoir is to be covered by earth, the roof shall be sloped to drain toward the outside edge of the tank.

R309-545-9. Tank Roof and Sidewalls.

(1) Protection From Contamination.

All drinking water storage structures shall have suitable watertight roofs and sidewalls which shall also exclude birds, animals, insects, and excessive dust.

(2) Openings.

Openings in the roof and sidewalls shall be kept to a minimum and comply with the following:

(a) Any pipes running through the roof or sidewall of a metal drinking water storage structure shall be welded, or properly gasketed. In new concrete tanks, these pipes shall be connected to standard wall castings with seepage rings which have been poured in place. Vent pipes, in additions to seepage rings, shall have raised concrete curbs which direct water away from the vent pipe and are formed as a single pour with the roof deck. No roof drains or any other pipes which may contain water of less quality than drinking water shall ever penetrate the roof, walls, or floor of a drinking water storage tank.

(b) Openings in a storage structure roof or top, designated to accommodate control apparatus or pump columns, shall be welded, gasketed, or curbed and sleeved as above, and shall have additional proper shielding to prevent vandalism.

Guidance: Valves and controls shall be located outside the storage structure so that the valve stems and similar projections will not pass through the roof or top of the reservoir.

(c) Openings shall be kept as far away as possible from the storage tank outlet and other sources of surface water.

(3) Adjacent Compartments.

Drinking water shall not be stored or conveyed in a compartment adjacent to wastewater when the two compartments are separated by a single wall.

(4) Slope of Roof.

The roof of all storage structures shall be designed for drainage. Parapets, or similar construction which would tend to hold water and snow, shall not be utilized unless adequate waterproofing and drainage are provided. Downspout or roof drain pipes shall not enter or pass through the reservoir.

R309-545-10. Internal Features.

Guidance: A means shall be provided for the draining of drinking water storage structures that is separate from the normal outlet pipeline. The floor of the storage structure shall be sloped to permit complete drainage of the structure. Also the maximum variation between high and low water levels in storage structures, providing pressure to a distribution system, shall not exceed 30 feet.

The following shall apply to internal features of drinking water storage structures:

(1) Drains.

If a drain is provided, it shall not discharge to a sanitary sewer. If local authority allows discharge to a storm drain, the drain discharge shall have a physical air gap of at least two pipe diameters between the discharge end of the pipe and the overflow rim of the receiving basin.

(2) Internal Catwalks.

Internal catwalks, if provided and located so as to be over the drinking water, shall have a solid floor with raised edges. The edges and floor shall be so designed that shoe scrapings or dirt will not fall into the drinking water.

(3) Inlet and Outlet.

To minimize potential sediment flow from the structure, the normal outlet pipes from all reservoirs shall be located in a manner to provide a silt trap prior to discharge into the distribution system.

Guidance: Where separate drains are not provided, removable silt stops shall be provided on reservoir discharge pipes.

(4) Disinfection.

If the drinking water reservoir is to be utilized as a contact basin for disinfection purposes, the design engineer shall conduct tracer studies or other tests, previously approved by the Director, to determine the minimum contact time and the potential for short circuiting.

Guidance: In order to minimize short circuiting and to maximize the effectiveness of any disinfection process, inlet and outlet pipes shall be as distant from one another as possible. Internal baffling may also be needed in order to minimize the possibility of short circuiting through the tank.

R309-545-11. ANSI/NSF International, Standard 61.

(1) ANSI/NSF Standard 61 Certification.

All interior surfaces or coatings shall consist of products which are certified by laboratories approved by ANSI and which comply with ANSI/NSF Standard 61 or other standards approved by the Director. This requirement applies to any pipes and fittings, protective materials (e.g. paints, coatings, concrete admixtures, concrete release agents, concrete sealers), joining and sealing materials (e.g. adhesives, caulks, gaskets, primers and sealants) and mechanical devices (e.g. electrical wire, switches, sensors, valves, submersible pumps) which are located so as to come into contact with the drinking water.

Guidance: If it can be shown to the satisfaction of the Director that flushing, swabbing, cleaning and disinfection procedures will adequately flush a coating (e.g. release agents, curing compounds, etc.) from the tank leaving no residual exceeding any MCL, the Director may accept it's use. Prior to placing a drinking water storage reservoir back in service, where products not certified to ANSI/NSF Standard 61 are utilized, the Director may require sampling and testing for a specific compound or ingredient based upon the product used.

(2) Curing Time and Volatile Organic Compounds.

If products which require a cure or set time are utilized in such a way as to come into contact with the drinking water, then water shall not be introduced into the vessel until any required curing time has passed. It shall be the responsibility of the water purveyor to assure that no tastes or odors, toxins or other compounds, which result in MCL exceedances, are imparted to the water as a result of tank repair.

Guidance: Prior to placing a drinking water storage reservoir back in service, an analysis for volatile organic compounds from water contained therein is advisable to establish that no such compounds have leached into the water.

R309-545-12. Steel Tanks.

(1) Paints.

Proper protection shall be given to all metal surfaces, both internal and external, by paints or other protective coatings. Internal coatings shall comply with ANSI/NSF Standard 61.

(2) Cathodic Protection.

If installed, internal cathodic protection shall be designed, installed and maintained by personnel trained in corrosion engineering.

R309-545-13. Tank Overflow.

All water storage structures shall be provided with an overflow which is discharged at an elevation between 12 and 24 inches above the ground surface with an appropriate air gap. The

discharges shall not cause erosion.

(1) Diameter.

All overflow pipes shall be of sufficient capacity to permit waste of water in excess of the filling rate.

(2) Slope.

All overflow pipes shall Be sloped for complete drainage,

(3) Screen.

All overflow pipes shall be screened with No. 4 mesh non-corrodible screen installed at a location least susceptible to damage by vandalism,

(4) Visible Discharge.

All overflow pipes shall be located so that any discharge is visible,

(5) Cross Connections.

All overflow pipes shall not be connected to, or discharge into, any sanitary sewer system.

(6) Paint.

If an overflow pipe within a reservoir is painted or otherwise coated, such coating shall comply with ANSI/NSF Standard 61.

R309-545-14. Access Openings.

Drinking water storage structures shall be designed with reasonably convenient access to the interior for cleaning and maintenance.

Guidance: When considering what is reasonably convenient, the design engineer shall consider that it may be necessary for one individual to open the access. The access shall be hinged at one side, and counter-weighted if the lid is in excess of 60 pounds.

(1) Height.

There shall be at least one opening above the water line which shall be framed at least four inches above the surface of the roof at the opening; or if on a buried structure, shall be elevated at least 18 inches above any earthen cover over the structure. The frame shall be securely fastened and sealed to the tank roof so as to prevent any liquid contaminant entering the tank. Concrete drinking water storage structures shall have raised curbs around access openings, formed and poured continuous with the pouring of the roof and sloped to direct water away from the frame.

Guidance: It is preferable that access openings be framed higher than the four inches

required above, and if located in areas subject to heavy snows, be more in the area of 24 to 36 inches.

(2) Shoebox Lid.

The frame of any access opening shall be provided with a close fitting solid shoebox type cover which extends down around the frame at least two inches and is furnished with a gasket(s) between the lid and frame,

Guidance: By "solid" the Division means having no opening, cracks or other penetrations of the lid which could allow liquid contaminants to enter the tank. Designers wishing to utilize pre-manufactured roof shutters as access lids for drinking water storage structures shall contact the distributor of such and make clear that any penetrations through the lid is not acceptable.

(3) Locking Device.

The lid to any access opening shall have a locking device.

R309-545-15. Venting.

Drinking water storage structures shall be vented. Overflows shall not be considered as vents. Vents provided on drinking water storage reservoirs shall:

(1) Inverted Vent.

Be downturned a minimum of two inches below any opening or shielded to prevent the entrance of surface water and rainwater.

(2) Open Discharge.

On buried structures, have the discharge a minimum of 24 inches above the earthen covering.

(3) Blockage.

Be located and sized so as to avoid blockage during winter conditions.

(4) Pests.

Exclude birds and animals.

(5) Dust.

Exclude insects and dust, as much as this function can be made compatible with effective venting.

(6) Screen.

Be fitted with No. 14 mesh or finer non-corrodible screen.

(7) Screen Protector.

Be fitted with additional heavy gage screen or substantial covering which will protect the No. 14 mesh screen against vandalism and, further, discourage purposeful attempts to contaminate the reservoir.

R309-545-16. Freezing Prevention.

All drinking water storage structures and their appurtenances, especially the riser pipes, overflows, and vents, shall be designed to prevent freezing which may interfere with proper functioning.

R309-545-17. Level Controls.

Adequate level control devices shall be provided to maintain water levels in storage structures.

R309-545-18. Security.

Locks on access manholes, and other necessary precautions shall be provided to prevent unauthorized entrance, vandalism, or sabotage.

Guidance: Fencing is advisable where the reservoir is highly accessible to the public or livestock. Where electricity or telemetry is available, consideration shall be given to the installation of electronic security equipment.

R309-545-19. Safety.

(1) Utah OSHA.

The safety of employees shall be considered in the design of the storage structure. Ladders, ladder guards, platform railings, and safely located entrance hatches shall be provided where applicable. As a minimum, such matters shall conform to pertinent laws and regulations of the Utah Occupational Safety and Health Administration.

(2) Ladders.

Generally, ladders having an unbroken length in excess of 20 feet shall be provided with appropriate safety devices. This requirement shall apply both to interior and exterior reservoir ladders.

(3) Requirements for Elevated Tanks.

Elevated tanks shall have railings or handholds provided for transfer from the access tube

to the water compartment.

R309-545-20. Disinfection.

Drinking water storage structures shall be disinfected before being put into service for the first time, and after being entered for cleaning, repair, or painting. The reservoir shall be cleaned of all refuse and shall then be washed with potable water prior to adding the disinfectant. AWWA Standard C652-02 shall be followed for reservoir disinfection, with the exception there shall be no delivery of waters used in the disinfection process to the distribution system, unless specifically authorized, in writing, by the Director.

Upon completing any of the three methods for storage tank chlorination, as outlined in AWWA C652-02, the water system must properly dispose of residual super-chlorinated waters in the outlet pipes. Other super-chlorinated waters, which are not to be ultimately diluted and delivered into the distribution system, shall also be properly disposed.

Guidance: The Director may require sampling and analysis of water prior to authorizing it's delivery into a distribution system.

Chlorinated water discharged from the storage tank shall be disposed of in an acceptable manner and in conformance with the rules of the Utah Water Quality Board (see R317 of the Utah Administrative Code).

R309-545-21. Incorporation by Reference.

The following list of Standards shall be considered as incorporated by reference in this specific rule. The most recent published copy of the referenced standard will apply in each case.

(1) AWWA Standards.

(a) C652-02, Disinfection of Water Storage Reservoirs.

(b) D100-05, Welded Steel Tanks for Water Storage.

(c) D101-53(R86), Inspecting and Repairing Steel Water Tanks, Standpipes, Reservoirs, and Elevated Tanks for Water Storage.

(d) D102-03, Coating Steel Water-Storage Tanks.

(e) D103-97, Factory-Coated Bolted Steel Tanks for Water Storage.

(f) D104-01, Automatically Controlled, Impressed-Current Cathodic Protection for the Interior of Steel Water Tanks.

(g) D110-04, Wire-Wound Circular Prestressed-Concrete Water Tanks (including addendum D110a-96).

(h) D115-95, Circular Prestressed Concrete Water Tanks With Circumferential Tendons.

(i) D120-02, Thermosetting Fiberglass-Reinforced Plastic Tanks.

(j) D130-02, Flexible-Membrane-Lining and Floating-Cover Materials for Potable-Water Storage.

(2) NSF International Standards.

(a) NSF 60, Drinking Water Treatment Chemicals - Health Effects.

(b) NSF 61, Drinking Water System Components - Health Effects.

(3) Utah OSHA.

Applicable standards of the Utah Occupational Safety and Health Administration are hereby incorporated by reference.

R309-545-22. Operation and Maintenance of Storage Tanks.

(1) Inspection and Cleaning.

Tanks which are entered for inspection and cleaning shall be disinfected in accordance with AWWA Standard C652-02 prior to being returned to service. When diver(s) enter storage tanks that have not been drained for inspection purposes, they shall comply with section five of the above standard unless the tank is constructed of steel, in which case they shall comply additionally with AWWA Standard D101-53(R86).

(2) Recoating or Repairing.

Any substance used to recoat or repair the interior of drinking water storage tank shall be certified to conform with ANSI/NSF Standard 61. If the tank is not drained for recoating or repairing, any substance or material used to repair interior coatings or cracks shall be suitable for underwater application, as indicated by the manufacturer, as well as comply with both ANSI/NSF Standards 60 and 61.

(3) Seasonal Use.

Water storage tanks which are operated seasonally shall be flushed and disinfected in accordance with AWWA Standard C652-02 prior to each season's use. Certification of proper disinfection, as evidenced by at least one satisfactory bacteriologic sample, shall be obtained by the system management and kept on file for inspection by personnel of the Division. During the non-use period, care shall be taken to see that openings to the water storage tank (those which are normally closed and sealed during normal use) are closed and secured.

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R309-550 Facility Design and Operation: Transmission and Distribution Pipelines

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R309-550. Facility Design and Operation: Transmission and Distribution Pipelines.

R309-550-1. Purpose.

The purpose of this rule is to provide specific requirements for the design and installation of transmission and distribution pipelines which are utilized to deliver culinary drinking water to facilities of public drinking water systems or to consumers. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-550-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63G, Chapter 3 of the same, known as the Administrative Rulemaking Act.

R309-550-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-550-4. General.

Transmission and distribution pipelines shall be designed, constructed and operated to convey adequate quantities of water at ample pressure, while maintaining water quality.

R309-550-5. Water Main Design.

(1) Distribution System Pressure.

The distribution system shall be designed to maintain minimum pressures as required in R309-105-9 (at ground level) at all points of connection, under all conditions of flow, but especially during peak day flow conditions, including fire flows.

Guidance: The normal working pressure in the distribution system shall be between 40 and 60 psi. When static pressure exceed 80 psi, pressure reducing devices shall be provided on mains in the distribution system, or individual home pressure reducing valves shall be installed per the Utah Plumbing Code.

(2) Assumed Flow Rates.

Flow rates to be assumed when designing or analyzing distribution systems shall be as given in R309-510 of these rules.

(3) Computerized Network Analysis.

(a) All water mains shall be sized after a hydraulic analysis based on flow demands and pressure requirements. If the calculations needed to conduct this hydraulic analysis are complex, a computerized network analysis shall be performed to verify that the distribution system will be capable of meeting the requirements of this rule.

(b) Where improvements will upgrade more than 50% of an existing distribution system, or where a new distribution system is proposed, a hydraulic analysis of the entire system shall be prepared and submitted for review prior to plan approval.

(c) In the analysis and design of water distribution systems, the following Hazen-William coefficients shall be used: PVC pipe = 140; Ductile Iron Pipe = 120; Cement-Mortar Lined Ductile Iron Pipe = 130 to 140.

(4) Minimum Water Main Size.

For water mains not connected to fire hydrants, the minimum line size shall be 4-inch diameter. Minimum water main size serving a fire hydrant lateral shall be 8-inch diameter unless a hydraulic analysis indicates that required flow and pressures can be maintained by smaller lines.

Guidance: Generally, velocity in a water main shall not exceed 5 fps. Mains shall be designed with sufficient excess capacity to provide for anticipated future connections.

(5) Fire Protection.

If a public water system is required to provide water for fire suppression by the local fire authority, or if the system has installed fire hydrants on existing distribution mains for that purpose:

(a) The design of the distribution system shall be consistent with Appendix B of the 2003 International Fire Code. As specified in this code, minimum fire-flow requirements are:

(i) 1000 gpm for one- and two-family dwellings with an area of less than 3600 square feet.

(ii) 1500 gpm or greater for all other buildings.

(b) The location of fire hydrants shall be consistent with Appendix C of the 2003

International Fire Code. As specified in this code, average spacing between hydrants must be no greater than 500 ft.

Guidance: Generally, individual hydrant spacing may range from 350 to 500 feet depending on the area being served. Hydrants shall be provided at each street intersection and at intermediate points between intersection. The planning of hydrant locations shall be a cooperative effort between the water utility and local fire officials.

(c) An exception to the fire protection requirements of (a) and (b) may be granted if a suitable statement is received from the local fire protection authority.

(d) Water mains not designed to carry fire flows shall not have fire hydrants connected to them.

(e) Representative locations while minimum pressures as required in R309-105-9 are maintained at all times and at all points in the distribution system.

Guidance: For guidance on conducting this analysis, refer to AWWA Manual M31, Distribution System Requirements for Fire Protection.

(f) As a minimum, the flows to be assumed during a fire-flow analysis shall be the "peak day demand" plus the fire flow requirement.

Guidance: See section R309-510-5 for information on how to estimate the "peak day demand" for various types of public water systems.

(6) Geologic Considerations.

The character of the soil through which water mains are to be laid shall be considered. This information shall accompany any submittal for a pipeline project.

Guidance: If possible, pipelines shall not be laid in areas of unusual geologic hazard (e.g. slide zones, fault zones, etc.) Where these areas are impossible to avoid, special design and buriel techniqes shall be employed. IN areas of high earthquake hazard, it is recommended that pipe be of a type least vulnerable to damage by earthquake, such as ductile-iron and PVC pipe.

(7) Dead Ends.

(a) In order to provide increased reliability of service and reduce head loss, dead ends shall be minimized by making appropriate tie-ins whenever practical.

(b) Where dead-end mains occur, they shall be provided with a fire hydrant if flow and pressure are sufficient, or with an approved flushing hydrant or blow-off for flushing purposes. Flushing devices shall be sized to provide flows which will give a velocity of at least 2.5 fps in the water main being flushed. No flushing

device shall be directly connected to any sewer.

(8) Valves.

Sufficient valves shall be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves shall be located at not more than 500 foot intervals in commercial districts and at not more than one block or 800 foot intervals in other districts. Where systems serve widely scattered customers and where future development is not expected, the valve spacing shall not exceed one mile.

(9) Corrosive Soils.

The design engineer shall consider the materials to be used when corrosive soils or waters will be encountered.

Guidance: Where severe corrosion is indicated, approved plastic pipe is recommended.

(10) Special Precautions in Areas of Groundwater Contamination by Organic Compounds.

Where distribution systems are installed in areas of groundwater contaminated by organic compounds:

(a) Pipe and joint materials which are not subject to permeation of the organic compounds shall be used.

(b) Non-permeable materials shall be used for all portions of the system including water main, service connections and hydrant leads.

(11) Separation of Water Mains from Other Sources of Contamination.

Design engineers shall exercise caution when locating water mains at or near certain sites such as sewage treatment plants or industrial complexes. Individual septic tanks shall be located and avoided. The engineer shall contact the Division to establish specific design requirements for locating water mains near any source of contamination.

R309-550-6. Component Materials and Design.

(1) NSF Standard for Health Effects.

All materials which may contact drinking water, including pipes, gaskets, lubricants and O-Rings, shall be ANSI-certified as meeting the requirements of NSF Standard 61, Drinking Water System Components - Health Effects. To permit field-verification of this certification, all such components shall be appropriately stamped with the NSF logo.

(2) Restrictions on Asbestos and Lead.

(a) The use of asbestos cement pipe shall not be allowed.

(b) Pipes and pipe fittings containing more than 8% lead shall not be used. Lead-tip gaskets shall not be used. Repairs to lead-joint pipe shall be made using alternative methods.

(3) AWWA Standards for Mechanical Properties.

Pipe, joints, fittings, valves and fire hydrants shall conform to NSF Standard 61 or Standard 14, and applicable sections of ANSI/AWWA Standards C104-A21.4-03 through C550-05 and C900-07 through C950-07.

(4) Used Materials.

Only materials which have been used previously for conveying potable water may be reused. Used materials shall meet the above standards, be thoroughly cleaned, and be restored practically to their original condition.

(5) Fire Hydrant Design.

Guidance: Fire hydrants shall have a bottom valve size of at least five inches, one 4.5 inch pumper nozzle and two 2.5 in nozzles.

Guidance: The hydrant lead shall be a minimum of six inches in diameter. Auxiliary valves shall be installed in all hydrant leads.

Hydrant drains shall not be connected to or located within 10 feet of sanitary sewers or storm drains.

Guidance: Hydrant drains shall be plugged. When the drains are plugged, the barrels shall be pumped dry after use during freezing weather. Where hydrant drains are not plugged, a gravel pocket or dry well shall be provided unless the natural soils will provide adequate drainage.

(6) Air Relief Valves.

At high points in water mains where air can accumulate, provisions shall be made to remove air by means of hydrants or air relief valves. Automatic air relief valves shall not be used in situations where flooding may occur.

Guidance: The air relief valve shall be placed so as to prevent problems due to freezing. A shut-off valve shall be provided to permit servicing of any air relief valve.

(a) Air Relief Valve Vent Piping.

The open end of an air relief vent pipe from automatic valves shall, where possible as determined by public water system management, be extended to at least one foot above grade and provided with a screened (#14 mesh, non-corrodible) downward elbow. Alternately, the open end of the pipe may be extended to as little as one foot above the top of the pipe if the valve's chamber is not subject to flooding and provided with a drain-to-daylight (See (b) below). Blow-offs or air relief valves shall not be connected directly to any sewer.

(b) Chamber Drainage.

Chambers, pits or manholes containing valves, blow-offs, meters, other such appurtenances to a distribution system, shall not be connected directly to any storm drain or sanitary sewer. They shall be provided with a drain to daylight. Where this is not possible, underground gravel filled absorption pits may be used if the site is not subject to flooding and conditions will assure adequate drainage. Where a chamber contains an air relief valve, and it is not possible to provide a drain-to-daylight, the vent pipe from the valve shall be extended to at least one foot above grade (See (a) above). Only when it is both impossible to extend the vent pipe above grade, and impossible to provide a drain-to-daylight may a gravel filled sump be utilized to provide chamber drainage (assuming local ground conditions permit adequate drainage without ground water intrusion).

Guidance: PVC Pipe Considerations. Consideration shall be given to placing tracer tape on PVC pipe to permit location of the pipe by available detection equipment. Furthermore, systems subject to severe freezing episodes shall consider that a typical method for thawing pipe requires metal pipe.

R309-550-7. Separation of Water Mains and Transmission Lines from Sewers and Other Pollution Sources.

(1) Basic Separation Standards.

The horizontal distance between pressure water mains and sanitary sewer lines shall be at least ten feet. Where a water main and a sewer line must cross, the water main shall be at least 18 inches above the sewer line. Separation distances shall be measured edge-to-edge (i.e. from the nearest edges of the facilities). Water mains and sewer lines shall not be installed in the same trench.

(2) Exceptions to Basic Separation Standards.

Local conditions, such as available space, limited slope, existing structures, etc., may create a situation where there is no alternative but to install water mains or sewer lines at a distance less than that required by Subsection (1), above. Exceptions to the rule may be

provided by the Director if it can be shown that the granting of such an exception will not jeopardize the public health.

(3) Special Provisions.

The following special provisions apply to all situations:

(a) The basic separation standards are applicable under normal conditions for sewage collection lines and water distribution mains. More stringent requirements may be necessary if conditions such as high groundwater exist.

(b) Sewer lines shall not be installed within 25 feet horizontally of a low head (5 psi or less pressure) water main.

(c) Sewer lines shall not be installed within 50 feet horizontally of any transmission line segment which may become unpressurized.

(d) New water mains and sewers shall be pressure tested where the conduits are located ten feet apart or less.

(e) In the installation of water mains or sewer lines, measures shall be taken to prevent or minimize disturbances of the existing line.

(f) Special consideration shall be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit, such as a septic sewage which produces corrosive hydrogen sulfide

(g) Sewer Force Mains

(i) Sewer force mains shall not be installed within ten feet (horizontally) of a water main.

(ii) When a sewer force main must cross a water line, the crossing shall be as close as practical to the perpendicular. The sewer force main shall be at least 18 inches below the water line.

(iii) When a new sewer force main crosses under an existing water main, all portions of the sewer force main within ten feet (horizontally) of the water main shall be enclosed in a continuous sleeve.

(iv) When a new water main crosses over an existing sewer force main, the water main shall be constructed of pipe materials with a minimum rated working pressure of 200 psi or equivalent pressure rating.

(4) Water Service Laterals Crossing Sewer Mains and Laterals.

Water service laterals shall conform to all requirements given herein for the separation of

water and sewer lines.

R309-550-8. Installation of Water Mains.

(1) Standards.

(a) The specifications shall incorporate the provisions of the manufacturer's recommended installation procedures or the following standards:

(i) AWWA Standard C600-05, Installation of Ductile Iron Water Mains and Their Appurtenances

(ii) ASTM D2774, Recommended Practice for Underground Installation of Thermoplastic Pressure Piping and PVC Pipe

(b) The provisions of the following publication shall be followed for PVC pipe design and installation:

(c) PVC Pipe - Design and Installation, AWWA Manual M23, 2002, published by the American Water Works Association

(2) Bedding.

A continuous and uniform bedding shall be provided in the trench for all buried pipe. Stones larger than the backfill materials described below shall be removed for a depth of at least six inches below the bottom of the pipe.

(3) Backfill.

Backfill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. The material and backfill zones shall be as specified by the standards referenced in Subsection (1), above. As a minimum:

(a) For plastic pipe, backfill material with a maximum particle size of 3/4 inch shall be used to surround the pipe.

(b) For ductile iron pipe, backfill material shall contain no stones larger than 2 inches.

(4) Dropping Pipe into Trench.

Under no circumstances shall the pipe or accessories be dropped into the trench.

(5) Burial Cover.

All water mains shall be covered with sufficient earth or other insulation to prevent freezing unless they are part of a non-community system that can be shut-down and

drained during winter months when temperatures are below freezing.

Guidance: Pipe shall be buried at least 12 inches below maximum expected frost penetration. The following is a list of reported pipe burial depths in Utah which may serve as a guide in this respect:

(A) Logan - 5ft.
(B) Salt Lake City - 3.5 ft. (5 ft. in high benches)
(C) Alta/Snowbird - 6 ft. (7 ft. if under roadway)
(D) St. George - 3ft.
(E) Park City - 5ft. (7 ft. above 7000 ft. elevation)
(F) Richfield - 4 ft.
(G) Moab - 4 ft.

(6) Thrust Blocking.

All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement.

(7) Pressure and Leakage Testing.

All types of installed pipe shall be pressure tested and leakage tested in accordance with AWWA Standard C600-99.

(8) Surface Water Crossings.

Guidance: Surface water crossings, whether over or under water, present special problems; the Division shall be consulted before final plans are prepared.

(a) Above Water Crossings

The pipe shall be adequately supported and anchored, protected from damage and freezing, and accessible for repair or replacement.

(b) Underwater Crossings

A minimum cover of two feet or greater, as local conditions may dictate, shall be provided over the pipe. When crossing water courses which are greater than 15 feet in width, the following shall be provided:

(i) The pipe shall be of special construction, having restrained joints for any joints within the surface water course and flexible restrained joints at both edges of the water course.

(ii) Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair; the valves shall be easily

accessible, and not subject to flooding; and the valve nearest to the supply source shall be in a manhole.

(iii) Permanent taps shall be made on each side of the valve within the manhole to allow insertion of testing equipment to determine leakage and for sampling purposes.

(9) Sealing Pipe Ends During Construction.

The open ends of all pipeline under construction shall be covered and effectively sealed at the end of the day's work.

(10) Disinfecting Water Distribution Systems.

All new water mains or appurtenances shall be disinfected in accordance with AWWA Standard C651-05. The specifications shall include detailed procedures for the adequate flushing, disinfection and microbiological testing of all water mains. On all new and extensive distribution system construction, evidence of satisfactory disinfection shall be provided to the Division. Samples for coliform analyses shall be collected after disinfection is complete and the system is refilled with potable water. A standard heterotrophic plate count is advisable. The use of water for culinary purposes shall not commence until the bacteriologic tests indicate the water to be free from contamination.

R309-550-9. Cross Connections and Interconnections.

(1) Physical Cross Connections.

There shall be no physical cross connections between the distribution system and pipe, pumps, hydrants, or tanks which are supplied from, or which may be supplied or contaminated from, any source except as approved by the Director.

(2) Recycled Water.

Neither steam condensate nor cooling water from engine jackets or other heat exchange devices shall be returned to the potable water supply.

(3) System Interconnects.

The approval of the Director shall be obtained for interconnections between different potable water supply systems.

R309-550-10. Water Hauling.

Water hauling is not an acceptable permanent method for culinary water distribution in community water systems. Proposals for water hauling shall be submitted to and approved by the Director.

(1) Exceptions.

The Director may allow its use for non-community public water supplies if:

(a) Consumers could not otherwise be supplied with good quality drinking water, or

(b) The nature of the development, or ground conditions, are such that the placement of a pipe distribution system is not justified.

(2) Emergencies.

Hauling may also be necessary as a temporary means of providing culinary water in an emergency.

Guidance: The guidelines for water hauling are contained in the bulletin entitled "Recommended Procedures for Hauling Culinary Water" available from the Division.

R309-550-11. Service Connections and Plumbing.

(1) Service Taps.

Service taps shall be made so as to not jeopardize the sanitary quality of the system's water.

(2) Plumbing.

(a) Service lines shall be capped until used.

(b) Water services and plumbing shall conform to the Utah Plumbing Code. Solders and flux containing more than 0.2% lead and pipe and pipe fittings containing more than 8% lead shall not be used.

(3) Individual Home Booster Pumps.

Individual booster pumps shall not be allowed for any individual service from the public water supply mains. Exceptions to the rule may be provided by the Director if it can be shown that the granting of such an exception will not jeopardize the public health.

Guidance: Public water systems are responsible to adequately design and maintain their systems in order to deliver an adequate quantity of clean, safe, drinking water to their customers while maintaining certain minimum pressures at all times, including peak demands (see R309-105-9).

Public water systems are being required to develop and operate a program to protect their systems from backflow or backsiphonage. An individual home booster pump, if installed such that the suction side of the pump draws directly from the system's water

main rather than through an intermediate holding tank, may reduce the pressure in the main to less than 20 psi (perhaps even creating a vacuum), thereby increasing the potential for contaminated water to enter the distribution system through any minor undetected leaks that may exist.

We cannot regulate the individual homeowner, but we do not want to encourage public water systems to proliferate the use of such pumps. Rule R309-105-6(2)(b) ("exceptions") will still be available for individual cases where there is no other acceptable alternative, but each public water system shall review language included in their service agreements with customers and perhaps modify such as needed to make it clear to the homeowner and any plumbing inspector that such pumps are not allowed, even if stated otherwise by the Plumbing Code, without the permission of the supplier and authorized by the Director.

(4) Service Lines.

The portion of the service line under the control of the water supplier is considered to be part of the distribution system and shall comply with all requirements given herein.

(5) Service Meters and Building Service Line.

Connections between the service meter and the home shall be in accordance with the Utah Plumbing Code.

(6) Allowable Connections.

All dwellings or other facilities connected to a public water supply shall be in conformance with the Utah Plumbing Code.

R309-550-12. Transmission Lines.

(1) Unpressurized Flows.

Transmission lines shall conform to all applicable requirements in this rule. Transmission line design shall minimize unpressurized flows.

(2) Proximity to Concentrated Sources of Pollution.

A water supplier shall not route an unpressurized transmission line any closer than fifty feet to any concentrated source of pollution (i.e. septic tanks and drain fields, garbage dumps, pit privies, sewer lines, feed lots, etc.). Furthermore, unpressurized transmission lines shall not be placed in boggy areas or areas subject to the ponding of water.

(3) Exceptions.

Where the water supplier cannot obtain a fifty foot separation distance from concentrated sources of pollution, it is permitted to use a Class 50 ductile iron pipe with joints acceptable to the Director. Reasonable assurance must be provided to assure that

contamination will not be able to enter the unpressurized pipeline.

Guidance: To assure continued protection of the transmission line, the water supplier shall obtain a fifty foot right-of-way on each side of the transmission line.

Guidance: Water supply conduits and major service lines crossing known fault areas shall be either designed to accommodate significant differential movement of the ground or be valued immediately above and below the points of fault crossing to allow control of water flow in case of pipe rupture during an earthquake event.

Guidance: Water supply systems which receive their supply from more than one source shall be designed to provide alternative flow paths for major conduits in regions of known faults or, if such is not possible, that parallel routing of major conduits be avoided.

R309-550-13. Operation and Maintenance.

(1) Disinfection After Line Repair.

The disinfection procedures of Section 4.7, AWWA Standard C651-05 shall be followed if any water main is cut into or repaired.

(2) Cross Connections.

The water supplier shall not allow a connection which may jeopardize water quality. Cross connections are not allowed unless controlled by an approved and properly operating backflow prevention assembly. The requirements of the Utah Plumbing Code shall be met with respect to cross connection control and backflow prevention.

Suppliers shall maintain an inventory of each pressure vacuum breaker assembly, spill-resistant vacuum breaker assembly, double check valve assembly, reduced pressure principle backflow prevention assembly, and high hazard air gap used by their customers, and a service/inspection record for each such assembly.

Backflow prevention assemblies shall be inspected and tested at least once a year, by an individual certified for such work. This responsibility may be borne by the water system or the water system management may require that the customer having the backflow prevention assembly be responsible for having the device tested.

Suppliers serving areas also served by a pressurized irrigation system shall prevent cross connections between the two. Requirements for pressurized irrigation systems are outlined in Section 19-4-112 of the Utah Code.

(3) NSF Standards.

All pipe and fittings used in routine operation and maintenance shall be ANSI-certified as

meeting NSF Standard 61 or Standard 14.

(4) Seasonal Operation.

Water systems operated seasonally shall be disinfected and flushed according to the techniques given in AWWA Standard C651-05 for pipelines and AWWA Standard C652-02 for storage facilities prior to each season's use. A satisfactory bacteriologic sample shall be achieved prior to use. During the non-use period, care shall be taken to close all openings into the system.

Guidance: Emergencies

Water systems in areas subject to high earthquake hazard are encouraged to develop contingency plans for obtaining pipe and appurtenances in an emergency. The stockpiling of material shall be considered.

Guidance: Operation and Maintenance Procedures Requiring Plan Approval.

Refer to Subsection R309-500-5 to determine under what circumstances a pipeline repair or replacement procedure shall be pre-approved by the Division.

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R309-600. Source Protection: Drinking Water Source Protection for Ground-Water Sources.

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R309-600. Source Protection: Drinking Water Source Protection For Ground-Water Sources.

R309-600-1. Authority.

Under authority of Section 19-4-104(1)(a)(iv), the Drinking Water Board adopts this rule which governs the protection of ground-water sources of drinking water.

R309-600-2. Purpose.

Public Water Systems (PWSs) are responsible for protecting their sources of drinking water from contamination. R309-600 sets forth minimum requirements to establish a uniform, statewide program for implementation by PWSs to protect their ground-water sources of drinking water. PWSs are encouraged to enact more stringent programs to protect their sources of drinking water if they decide they are necessary.

R309-600 applies to ground-water sources and to ground-water sources which are under the direct influence of surface water which are used by PWSs to supply their systems with drinking water. However, compliance with this rule is voluntary for existing ground-water sources of drinking water which are used by public (transient) non-community water systems.

R309-600-3. Implementation.

(1) New Ground-Water Sources - Each PWS shall submit a Preliminary Evaluation Report (PER) in accordance with R309-600-13(2) for each of its new ground-water sources to the Division of Drinking Water (DDW). A PWS shall not begin construction of a new source until the Executive Secretary concurs with its PER.

(2) Existing Ground-Water Sources - Each PWS shall submit a Drinking Water Source Protection (DWSP) Plan in accordance with R309-600-7(1) for each of its existing ground-water sources to DDW according to the following schedule. Well fields or groups of springs may be considered to be a single source.

TABLE 1

Population Served by PWS	Percent of Sources	DWSP Plans Due by
Over 10,000	50% of Wells	December 31, 1995
Over 10,000	100% of Wells	December 31, 1996
3,300 – 10,000	100% of Wells	December 31, 1997
Less than 3,300	100% of Wells	December 31, 1998

Springs and other sources	100%	December 31, 1999

(3) DWSP for existing ground-water sources under the direct influence of surface water shall be accomplished through delineation of both the ground water and surface water contribution areas. The requirements of R309-600-7(1) apply to the ground water portion and the requirements of R309-605 apply to the surface water portion, except that the schedule for submitting these DWSP plans to DDW is based on the schedule in R309-605-3(1).

(4) PWSs shall maintain all land use agreements which were established under previous rules to protect their ground-water sources of drinking water from contamination.

R309-600-4. Exceptions.

(1) Exceptions to the requirements of R309-600 or parts thereof may be granted by the Executive Secretary to PWSs if: due to compelling factors (which may include economic factors), a PWS is unable to comply with these requirements, and the granting of an exception will not result in an unreasonable risk to health.

(2) The Executive Secretary may prescribe a schedule by which the PWS must come into compliance with the requirements of R309-600.

R309-600-5. Designated Person.

(1) A designated person shall be appointed and reported in writing to the Executive Secretary by each PWS within 180 days of the effective date of R309-600. The designated person's address and telephone number shall be included in the written correspondence. Additionally, the above information must be included in each DWSP Plan and PER that is submitted to DDW.

(2) Each PWS shall notify the Executive Secretary in writing within 30 days of any changes in the appointment of a designated person.

R309-600-6. Definitions.

(1) The following terms are defined for the purposes of this rule:

(a) "Collection area" means the area surrounding a ground-water source which is underlain by collection pipes, tile, tunnels, infiltration boxes, or other ground-water collection devices.

(b) "Controls" means the codes, ordinances, rules, and regulations currently in effect to regulate a potential contamination source. "Controls" also means

physical controls which may prevent contaminants from migrating off of a site and into surface or ground water. "Controls" also means negligible quantities of contaminants.

(c) "Criteria" means the conceptual standards that form the basis for DWSP area delineation to include distance, ground-water time of travel, aquifer boundaries, and ground-water divides.

(d) "Criteria threshold" means a value or set of values selected to represent the limits above or below which a given criterion will cease to provide the desired degree of protection.

(e) "DDW" means Division of Drinking Water.

(f) "DWSP Program" means the program to protect drinking water source protection zones and management areas from contaminants that may have an adverse effect on the health of persons.

(g) "DWSP Zone" means the surface and subsurface area surrounding a ground-water source of drinking water supplying a PWS, through which contaminants are reasonably likely to move toward and reach such ground-water source.

(h) "Designated person" means the person appointed by a PWS to ensure that the requirements of R309-600 are met.

(i) "Engineer" means a person licensed under the Professional Engineers and Land Surveyors Licensing Act, 58-22 of the Utah Code, as a "professional engineer" as defined therein.

(j) "Executive Secretary" means the individual authorized by the Drinking Water Board to conduct business on its behalf.

(k) "Existing ground-water source of drinking water" means a public supply ground-water source for which plans and specifications were submitted to DDW on or before July 26, 1993.

(l) "Geologist" means a person licensed under the Professional Geologist Licensing Act, 58-76 of the Utah Code, as a "professional geologist" as defined therein.

(m) "Ground-water Source" means any well, spring, tunnel, adit, or other underground opening from or through which ground-water flows or is pumped from subsurface water-bearing formations.

(n) "Hydrogeologic methods" means the techniques used to translate selected criteria and criteria thresholds into mappable delineation boundaries. These

methods include, but are not limited to, arbitrary fixed radii, analytical calculations and models, hydrogeologic mapping, and numerical flow models.

(o) "Land management strategies" means zoning and non-zoning strategies which include, but are not limited to, the following: zoning and subdivision ordinances, site plan reviews, design and operating standards, source prohibitions, purchase of property and development rights, public education programs, ground-water monitoring, household hazardous waste collection programs, water conservation programs, memoranda of understanding, written contracts and agreements, and so forth.

(p) "Land use agreement" means a written agreement wherein the owner(s) agrees not to locate or allow the location of uncontrolled potential contamination sources or pollution sources within zone one of new wells in protected aquifers. The owner(s) must also agree not to locate or allow the location of pollution sources within zone two of new wells in unprotected aquifers and new springs unless the pollution source agrees to install design standards which prevent contaminated discharges to ground water. This restriction must be binding on all heirs, successors, and assigns. Land use agreements must be recorded with the property description in the local county recorder's office. Refer to R309-600-13(2)(d).

Land use agreements for protection areas on publicly owned lands need not be recorded in the local county recorder office. However, a letter must be obtained from the Administrator of the land in question and meet the requirements described above.

(q) "Management area" means the area outside of zone one and within a two-mile radius where the Optional Two-mile Radius Delineation Procedure has been used to identify a protection area.

For wells, land may be excluded from the DWSP management area at locations where it is more than 100 feet lower in elevation than the total drilled depth of the well.

For springs and tunnels, the DWSP management area is all land at elevation equal to or higher than, and within a two-mile radius, of the spring or tunnel collection area. The DWSP management area also includes all land lower in elevation than, and within 100 horizontal feet, of the spring or tunnel collection area. The elevation datum to be used is the point of water collection. Land may also be excluded from the DWSP management area at locations where it is separated from the ground-water source by a surface drainage which is lower in elevation than the spring or tunnel collection area.

(r) "New ground-water source of drinking water" means a public supply ground-water source of drinking water for which plans and specifications are submitted to DDW after July 26, 1993.

(s) "Nonpoint source" means any diffuse source of pollutants or contaminants not otherwise defined as a point source.

(t) "PWS" means public water system.

(u) "Point source" means any discernible, confined, and discrete source of pollutants or contaminants, including but not limited to any site, pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, animal feeding operation with more than ten animal units, landfill, or vessel or other floating craft, from which pollutants are or may be discharged.

(v) "Pollution source" means point source discharges of contaminants to ground water or potential discharges of the liquid forms of "extremely hazardous substances" which are stored in containers in excess of "applicable threshold planning quantities" as specified in SARA Title III. Examples of possible pollution sources include, but are not limited to, the following: storage facilities that store the liquid forms of extremely hazardous substances, septic tanks, drain fields, class V underground injection wells, landfills, open dumps, landfilling of sludge and septage, manure piles, salt piles, pit privies, drain lines, and animal feeding operations with more than ten animal units.

The following definitions are part of R309-600 and clarify the meaning of "pollution source:"

> (i) "Animal feeding operation" means a lot or facility where the following conditions are met: animals have been or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12 month period, and crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Two or more animal feeding operations under common ownership are considered to be a single feeding operation if they adjoin each other, if they use a common area, or if they use a common system for the disposal of wastes.
>
> (ii) "Animal unit" means a unit of measurement for any animal feeding operation calculated by adding the following numbers; the number of slaughter and feeder cattle multiplied by 1.0, plus the number of mature dairy cattle multiplied by 1.4, plus the number of swine weighing over 55 pounds multiplied by 0.4, plus the number of sheep multiplied by 0.1, plus the number of horses multiplied by 2.0.
>
> (iii) "Extremely hazardous substances" means those substances which are identified in the Sec. 302(EHS) column of the "Title III List of Lists: Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(R) of the

Clean Air Act, As Amended," (550B98017). A copy of this document may be obtained from: NCEPI, PO Box 42419, Cincinnati, OH 45202. Online ordering is also available at http://www.epa.gov/ncepihom/orderpub.html.

(w) "Potential contamination source" means any facility or site which employs an activity or procedure which may potentially contaminate ground water. A pollution source is also a potential contamination source.

(x) "Protected aquifer" means a producing aquifer in which the following conditions are met:

(i) A naturally protective layer of clay, at least 30 feet in thickness, is present above the aquifer;

(ii) the PWS provides data to indicate the lateral continuity of the clay layer to the extent of zone two; and

(iii) the public-supply well is grouted with a grout seal that extends from the ground surface down to at least 100 feet below the surface, and for a thickness of at least 30 feet through the protective clay layer.

(y) "Replacement well" means a public-supply well drilled for the sole purpose of replacing an existing public-supply well which is impaired or made useless by structural difficulties and in which the following conditions are met:

(i) the proposed well location shall be within a radius of 150 feet from an existing ground-water supply well, as defined in R309-600-6(1)(k); and

(ii) the PWS provides a copy of the replacement application approved by the State Engineer (refer to Section 73-3-28 of the Utah Code Annotated).

(z) "Time of travel" means the time required for a particle of water to move in the producing aquifer from a specific point to a ground-water source of drinking water.

(aa) "Unprotected aquifer" means any aquifer that does not meet the definition of a protected aquifer.

(bb) "Wellhead" means the physical structure, facility, or device at the land surface from or through which ground-water flows or is pumped from subsurface, water-bearing formations.

R309-600-7. DWSP Plans.

(1) Each PWS shall develop, submit, and implement a DWSP Plan for each of its ground-water sources of drinking water.

Required Sections for DWSP Plans - DWSP Plans should be developed in accordance with the "Standard Report Format for Existing Wells and Springs." This document may be obtained from DDW. DWSP Plans must include the following seven sections:

(a) DWSP Delineation Report - A DWSP Delineation Report in accordance with R309-600-9(5)(6) is the first section of a DWSP Plan.

(b) Potential Contamination Source Inventory and Assessment of Controls - A Prioritized Inventory of Potential Contamination Sources and an assessment of their controls in accordance with R309-600-10 is the second section of a DWSP Plan.

(c) Management Program to Control Each Preexisting Potential Contamination Source - A Management Program to Control Each Preexisting Potential Contamination Source in accordance with R309-600-11 is the third section of a DWSP Plan.

(d) Management Program to Control or Prohibit Future Potential Contamination Sources - A Plan for Controlling or Prohibiting Future Potential Contamination Sources is the fourth section of a DWSP Plan. This must be in accordance with R309-600-12, consistent with the general provisions of this rule, and implemented to an extent allowed under the PWS's authority and jurisdiction.

(e) Implementation Schedule - Each PWS shall develop a step-by-step implementation schedule which lists each of its proposed land management strategies with an implementation date for each strategy.

(f) Resource Evaluation - Each PWS shall assess the financial and other resources which may be required for it to implement each of its DWSP Plans and determine how these resources may be acquired.

(g) Recordkeeping - Each PWS shall document changes in each of its DWSP Plans as they are continuously updated to show current conditions in the protection zones and management areas. As a DWSP Plan is executed, the PWS shall document any land management strategies that are implemented. These documents may include any of the following: ordinances, codes, permits, memoranda of understanding, public education programs, public notifications, and so forth.

(2) DWSP Plan Administration - DWSP Plans shall be submitted, corrected, retained, implemented, updated, and revised according to the following:

(a) Submitting DWSP Plans - Each PWS shall submit a DWSP Plan to DDW in accordance with the schedule in R309-600-3 for each of its ground-water sources of drinking water.

(b) Correcting Deficiencies - Each PWS shall correct any deficiencies in a disapproved DWSP Plan and resubmit it to DDW within 90 days of the disapproval date.

(c) Retaining DWSP Plans - Each PWS shall retain on its premises a current copy of each of its DWSP Plans.

(d) Implementing DWSP Plans - Each PWS shall begin implementing each of its DWSP Plans in accordance with its schedule in R309-600-7(1)(e), within 180 days after submittal if they are not disapproved by the Executive Secretary.

(e) Updating and Resubmitting DWSP Plans - Each PWS shall update its DWSP Plans as often as necessary to ensure they show current conditions in the DWSP zones and management areas. Updated plans also document the implementation of land management strategies in the recordkeeping section. Actual copies of any ordinances, codes, permits, memoranda of understanding, public education programs, bill stuffers, newsletters, training session agendas, minutes of meetings, memoranda for file, etc. must be submitted with the recordkeeping section of updated plans. DWSP Plans are initially due according to the schedule in R309-600-3. Thereafter, updated DWSP Plans are due every six years from their original due date. This applies even though a PWS may have been granted an extension beyond the original due date.

(f) Revising DWSP Plans - Each PWS shall submit a revised DWSP Plan to DDW within 180 days after the reconstruction or redevelopment of any ground-water source of drinking water which addresses changes in source construction, source development, hydrogeology, delineation, potential contamination sources, and proposed land management strategies.

R309-600-8. DWSP Plan Review.

(1) The Executive Secretary shall review each DWSP Plan submitted by PWSs and "concur," "concur with recommendations," "conditionally concur" or "disapprove" the plan.

(2) The Executive Secretary may "disapprove" DWSP Plans for any of the following reasons:

(a) An inaccurate DWSP Delineation Report, a report that uses a non-applicable delineation method, or a DWSP Plan that is missing this report or any of the information and data required in it (refer to R309-600-9(6));

(b) an inaccurate Prioritized Inventory of Potential Contamination Sources or a DWSP Plan that is missing this report or any of the information required in it (refer to R309-600-10(1));

(c) an inaccurate assessment of current controls (refer to R309-600-10(2));

(d) a missing Management Program to Control Each Preexisting Potential Contamination Source which has been assessed as "not adequately controlled" by the PWS (refer to R309-600-11(1));

(e) a missing Management Program to Control or Prohibit Future Potential Contamination Sources (refer to R309-600-12);

(f) a missing or incomplete Implementation Schedule, Resource Evaluation, Recordkeeping Section, Contingency Plan, or Public Notification Plan (refer to R309-600-7(1)(e)-(g), R309-600-14, and R309-600-15).

(3) The Executive Secretary may "concur with recommendations" when PWSs propose management programs to control preexisting potential contamination sources or management programs to control or prohibit future potential contamination sources for existing or new drinking water sources which appear inadequate or ineffective.

(4) The Executive Secretary may "conditionally concur" with a DWSP Plan or PER. The PWS must implement the conditions and report compliance the next time the DWSP Plan is due and submitted to DDW.

R309-600-9. Delineation of Protection Zones and Management Areas.

(1) PWSs shall delineate protection zones or a management area around each of their ground-water sources of drinking water using the Preferred Delineation Procedure or the Optional Two-mile Radius Delineation Procedure. The hydrogeologic method used by PWSs shall produce protection zones or a management area in accordance with the criteria thresholds below. PWSs may also choose to verify protected aquifer conditions to reduce the level of management controls applied in applicable protection areas.

(2) Reports must be prepared by a qualified licensed professional - A submitted report which addresses any of the following sections shall be stamped and signed by a professional geologist or professional engineer:

(a) A Delineation Report for Estimated DWSP Zones produced using the Preferred Delineation Procedure, as explained in R309-600-13(2)(a);

(b) a DWSP Delineation Report produced using the Preferred Delineation Procedure, as explained in R309-600-9(3)(a) and (6)(a);

(c) a report to verify protected aquifer conditions, as explained in R309-600-9(4) and (7);

(d) a report which addresses special conditions, as explained in R309-600-9(5); or

(e) a Hydrogeologic Report to Exclude a Potential Contamination Source, as explained in R309-600-9(6)(b)(ii).

(3) Criteria Thresholds for Ground-water Sources of Drinking Water:

(a) Preferred Delineation Procedure - Four zones are delineated for management purposes:

(i) Zone one is the area within a 100-foot radius from the wellhead or margin of the collection area.

(ii) Zone two is the area within a 250-day ground-water time of travel to the wellhead or margin of the collection area, the boundary of the aquifer(s) which supplies water to the ground-water source, or the ground-water divide, whichever is closer. If the available data indicate a zone of increased ground-water velocity within the producing aquifer(s), then time-of-travel calculations shall be based on this data.

(iii) Zone three (waiver criteria zone) is the area within a 3-year ground-water time of travel to the wellhead or margin of the collection area, the boundary of the aquifer(s) which supplies water to the ground-water source, or the ground-water divide, whichever is closer. If the available data indicate a zone of increased ground-water velocity within the producing aquifer(s), then time-of-travel calculations shall be based on this data.

(iv) Zone four is the area within a 15-year ground-water time of travel to the wellhead or margin of the collection area, the boundary of the aquifer(s) which supplies water to the ground-water source, or the ground-water divide, whichever is closer. If the available data indicate a zone of increased ground-water velocity within the producing aquifer(s), then time-of-travel calculation shall be based on this data.

(b) Optional Two-mile Radius Delineation Procedure - In place of the Preferred Delineation Procedure, PWSs may choose to use the Optional Two-mile Radius Delineation Procedure to delineate a management area. This procedure is best applied in remote areas where few if any potential contamination sources are located. Refer to R309-600-6(1)(q) for the definition of a management area.

(4) Protected Aquifer Classification - PWSs may choose to verify protected aquifer conditions to reduce the level of management controls for a public-supply well which produces water from a protected aquifer(s) or to meet one of the requirements of a VOC or pesticide susceptibility waiver (R309-600-16(4)). Refer to R309-600-6(1)(x) for the definition of a "protected aquifer."

(5) Special Conditions - Special scientific or engineering studies may be conducted to support a request for an exception (refer to R309-600-4) due to special conditions. These studies must be approved by the Executive Secretary before the PWS begins the study. Special studies may include confined aquifer conditions, ground-water movement through protective layers, wastewater transport and fate, etc.

(6) DWSP Delineation Report - Each PWS shall submit a DWSP Delineation Report to DDW for each of its ground-water sources using the Preferred Delineation Procedure or the Optional Two-mile Radius Delineation Procedure.

(a) Preferred Delineation Procedure - Delineation reports for protection zones delineated using the Preferred Delineation Procedure shall include the following information and a list of all sources or references for this information:

(i) Geologic Data - A brief description of geologic features and aquifer characteristics observed in the well and area of the potential protection zones. This should include the formal or informal stratigraphic name(s), lithology of the aquifer(s) and confining unit(s), and description of fractures and solution cavities (size, abundance, spacing, orientation) and faults (brief description of location in or near the well, and orientation). Lithologic descriptions can be obtained from surface hand samples or well cuttings; core samples and laboratory analyses are not necessary. Fractures, solution cavities, and faults may be described from surface outcrops or drill logs.

(ii) Well Construction Data - If the source is a well, the report shall include the well drillers log, elevation of the wellhead, borehole radius, casing radius, total depth of the well, depth and length of the screened or perforated interval(s), well screen or perforation type, casing type, method of well construction, type of pump, location of pump in the well, and the maximum projected pumping rate of the well. The maximum pumping rate of the well must be used in the delineation calculations. Averaged pumping rate values shall not be used.

(iii) Spring Construction Data - If the source is a spring or tunnel the report shall include a description or diagram of the collection area and method of ground-water collection.

(iv) Aquifer Data for New Wells - A summary report including the calculated hydraulic conductivity of the aquifer, transmissivity, hydraulic

gradient, direction of ground-water flow, estimated effective porosity, and saturated thickness of the producing aquifer(s). The PWS shall obtain the hydraulic conductivity of the aquifer from a constant-rate aquifer test and provide the data as described in R309-515-6(10)(b). Estimated effective porosity must be between 1% and 30%. Clay layers shall not be included in calculations of aquifer thickness or estimated effective porosity. This report shall include graphs, data, or printouts showing the interpretation of the aquifer test.

(v) Aquifer Data for Existing Wells - A summary report including the calculated hydraulic conductivity of the aquifer, transmissivity, hydraulic gradient, direction of ground-water flow, estimated effective porosity, and saturated thickness of the producing aquifer(s). The PWS shall obtain the hydraulic conductivity of the aquifer from a constant-rate aquifer test using the existing pumping equipment. Aquifer tests using observation wells are encouraged, but are not required. If a previously performed aquifer test is available and includes the required data described below, data from that test may be used instead. Estimated effective porosity must be between 1% and 30%. Clay layers shall not be included in calculations of aquifer thickness or estimated effective porosity. This report shall include graphs, data, or printouts showing the interpretation of the aquifer test.

If a constant-rate aquifer test is not practical, then the PWS shall obtain hydraulic conductivity of the aquifer using another appropriate method, such as data from a nearby well in the same aquifer, specific capacity of the well, published hydrogeologic studies of the same aquifer, or local or regional ground-water models. A constant-rate test may not be practical for such reasons as insufficient drawdown in the well, inaccessibility of the well for water-level measurements, or insufficient overflow capacity for the pumped water.

The constant-rate test shall:

(A) Provide for continuous pumping for at least 24 hours or until stabilized drawdown has continued for at least six hours. Stabilized drawdown is achieved when there is less than one foot of change of ground-water level in the well within a six-hour period.

(B) Provide data as described in R309-515-6(10)(b)(v) through (vii).

(vi) Additional Data for Observation Wells - If the aquifer test is conducted using observation wells, the report shall include the following information for each observation well: location and surface elevation; total depth; depth and length of the screened or perforated intervals; radius,

casing type, screen or perforation type, and method of construction; prepumping ground-water level; the time-drawdown or distance-drawdown data and curve; and the total drawdown.

(vii) Hydrogeologic Methods and Calculations - These include the ground-water model or other hydrogeologic method used to delineate the protection zones, all applicable equations, values, and the calculations which determine the delineated boundaries of zones two, three, and four. The hydrogeologic method or ground-water model must be reasonably applicable for the aquifer setting. For wells, the hydrogeologic method or ground-water model must include the effects of drawdown (increased hydraulic gradient near the well) and interference from other wells.

(viii) Map Showing Boundaries of the DWSP Zones - A map showing the location of the ground-water source of drinking water and the boundary for each DWSP zone. The base map shall be a 1:24,000-scale (7.5-minute series) topographic map, such as is published by the U.S. Geological Survey. Although zone one (100-foot radius around the well or margin of the collection area) need not be on the map, the complete boundaries for zones two, three, and four must be drawn and labeled. More detailed maps are optional and may be submitted in addition to the map required above.

The PWS shall also include a written description of the distances which define the delineated boundaries of zones two, three, and four. These written descriptions must include the maximum distances upgradient from the well, the maximum distances downgradient from the well, and the maximum widths of each protection zone.

(b) Optional Two-Mile Radius Delineation Procedure - Delineation Reports for protection areas delineated using the Optional Two-mile Radius Delineation Procedure shall include the following information:

(i) Map Showing Boundaries of the DWSP Management Area - A map showing the location of the ground-water source of drinking water and the DWSP management area boundary. The base map shall be a 1:24,000-scale (7.5-minute series) topographic map, such as is published by the U.S. Geological Survey. Although zone one (100-foot radius around the well or margin of the collection area) need not be on the map, the complete two-mile radius must be drawn and labeled. More detailed maps are optional and may be submitted in addition to the map required above.

(ii) Hydrogeologic Report to Exclude a Potential Contamination Source - To exclude a potential contamination source from the inventory which is required in R309-600-10(1), a hydrogeologic report is required which clearly demonstrates that the potential contamination source has no capacity to contaminate the source.

(7) Protected Aquifer Conditions - If a PWS chooses to verify protected aquifer conditions, it shall submit the following additional data to DDW for each of its ground-water sources for which the protected aquifer conditions apply. The report must state that the aquifer meets the definition of a protected aquifer based on the following information:

(a) thickness, depth, and lithology of the protective clay layer;

(b) data to indicate the lateral continuity of the protective clay layer over the extent of zone two. This may include such data as correlation of beds in multiple wells, published hydrogeologic studies, stratigraphic studies, potentiometric surface studies, and so forth; and

(c) evidence that the well has been grouted or otherwise sealed from the ground surface to a depth of at least 100 feet and for a thickness of at least 30 feet through the protective clay layer in accordance with R309-600-6(1)(x) and R309-515-6(6)(i).

R309-600-10. Potential Contamination Source Inventory and Identification and Assessment of Controls.

(1) Prioritized Inventory of Potential Contamination Sources - Each PWS shall list all potential contamination sources within each DWSP zone or management area in priority order and state the basis for this order. This priority ranking shall be according to relative risk to the drinking water source. The name and address of each commercial and industrial potential contamination source is required. Additional information should include the name and phone number of a contact person and a list of the chemical, biological, and/or radiological hazards associated with each potential contamination source. Additionally, each PWS shall identify each potential contamination source as to its location in zone one, two, three, four or in a management area and plot it on the map required in R309-600-9(5)(6)(a)(viii) or R309-600-9(5)(6)(b)(i).

(a) List of Potential Contamination Sources - A List of Potential Contamination Sources is found in the "Source Protection User's Guide for Ground-Water Sources." This document may be obtained from DDW. This list may be used by PWSs as a guide to inventorying potential contamination sources within their DWSP zones and management areas.

(b) Refining, Expanding, Updating, and Verifying Potential Contamination Sources - Each PWS shall update its list of potential contamination sources to show current conditions within DWSP zones or management areas. This includes adding potential contamination sources which have moved into DWSP zones or management areas, deleting potential contamination sources which have moved out, improving available data about potential contamination sources, and all other appropriate refinements.

(2) Identification and Assessment of Current Controls - PWSs are not required to plan and implement land management strategies for potential contamination source hazards that are assessed as "adequately controlled." If controls are not identified, the potential contamination source will be considered to be "not adequately controlled." Additionally, if the hazards at a potential contamination source cannot be identified, the potential contamination source must be assessed as "not adequately controlled." Identification and assessment should be limited to one of the following controls for each applicable hazard: regulatory, best management/pollution prevention, physical, or negligible quantity. Each of the following topics for a control must be addressed before identification and assessment will be considered to be complete. Refer to the "Source Protection User's Guide for Ground-Water Sources" for a list of government agencies and the programs they administer to control potential contamination sources. This guide may be obtained from DDW.

(a) Regulatory Controls - Identify the enforcement agency and verify that the hazard is being regulated by them; cite and/or quote applicable references in the regulation, rule or ordinance which pertain to controlling the hazard; explain how the regulatory control prevents ground-water contamination; assess the hazard; and set a date to reassess the hazard.

(b) Best Management/Pollution Prevention Practice Controls - List the specific best management/pollution prevention practices which have been implemented by potential contamination source management to control the hazard and indicate that they are willing to continue the use of these practices; explain how these practices prevent ground-water contamination; assess the hazard; and set a date to reassess the hazard.

(c) Physical Controls - Describe the physical control(s) which have been constructed to control the hazard; explain how these controls prevent contamination; assess the hazard; and set a date to reassess the hazard.

(d) Negligible Quantity Control - Identify the quantity of the hazard that is being used, disposed, stored, manufactured, and/or transported; explain why this amount should be considered a negligible quantity; assess the hazard; and set a date to reassess the hazard.

(3) For the purpose of meeting the requirements of R309-600, the Executive Secretary will consider a PWS's assessment that a potential contamination source which is covered by a permit or approval under one of the regulatory programs listed below sufficient to demonstrate that the source is adequately controlled unless otherwise determined by the Executive Secretary. For all other state programs, the PWS's assessment is subject to review by the Executive Secretary; as a result, a PWS's DWSP Plan may be disapproved if the Executive Secretary does not concur with its assessment(s).

(a) The Utah Ground-Water Quality Protection program established by Section 19-5-104 and R317-6;

(b) closure plans or Part B permits under authority of the Resource Conservation and Recovery Act (RCRA) of 1984 regarding the monitoring and treatment of ground water;

(c) the Utah Pollutant Discharge Elimination System (UPDES) established by Section 19-5-104 and R317-8;

(d) the Underground Storage Tank Program established by Section 19-6-403 and R311-200 through R311-208; and

(e) the Underground Injection Control (UIC) Program for classes I-IV established by Sections 19-5-104 and 40-6-5 and R317-7 and R649-5.

R309-600-11. Management Program to Control Each Preexisting Potential Contamination Source.

(1) PWSs shall plan land management strategies to control each preexisting potential contamination source in accordance with their authority and jurisdiction. Land management strategies must be consistent with the provisions of R309-600, designed to control potential contamination, and may be regulatory or non-regulatory. Each potential contamination source listed on the inventory required in R309-600-10(1) and assessed as "not adequately controlled" must be addressed. Land management strategies must be implemented according to the schedule required in R309-600-7(1)(e).

(2) PWSs with overlapping protection zones and management areas may cooperate in controlling a particular preexisting potential contamination source if one PWS will agree to take the lead in planning and implementing land management strategies and the remaining PWS(s) will assess the preexisting potential contamination source as "adequately controlled."

R309-600-12. Management Program to Control or Prohibit Future Potential Contamination Sources for Existing Drinking Water Sources.

(1) PWSs shall plan land management strategies to control or prohibit future potential contamination sources within each of its DWSP zones or management areas consistent with the provisions of R309-600 and to an extent allowed under its authority and jurisdiction. Land management strategies must be designed to control potential contamination and may be regulatory or non-regulatory. Additionally land management strategies must be implemented according to the schedule required in R309-600-7(1)(e).

(2) Protection areas may extend into neighboring cities, towns, and counties. Since it may not be possible for some PWSs to enact regulatory land management strategies outside of their jurisdiction, except as described below, it is recommended that these PWSs contact their neighboring cities, towns, and counties to see if they are willing to implement protective ordinances to prevent ground-water contamination under joint management agreements.

(3) Cities and towns have extraterritorial jurisdiction in accordance with Section 10-8-15 of the Utah Code Annotated to enact ordinances to protect a stream or "source" from which their water is taken... "for 15 miles above the point from which it is taken and for a distance of 300 feet on each side of such stream..." Section 10-8-15 includes ground-water sources.

(4) Zoning ordinances are an effective means to control potential contamination sources that may want to move into protection areas. They allow PWSs to prohibit facilities that would discharge contaminants directly to ground water. They also allow PWSs to review plans from potential contamination sources to ensure there will be adequate spill protection and waste disposal procedures, etc. If zoning ordinances are not used, PWSs must establish a plan to contact potential contamination sources individually as they move into protection areas, identify and assess their controls, and plan land management strategies if they are not adequately controlled.

R309-600-13. New Ground-water Sources of Drinking Water.

(1) Prior to constructing a new ground-water source of drinking water, each PWS shall develop a PER which demonstrates whether the source meets the requirements of this section and submit it to DDW. Additionally, engineering information in accordance with R309-515-6(5)(a) or R309-515-7(4) must be submitted to DDW. The Executive Secretary will not grant plan approval until both source protection and engineering requirements are met. Construction standards relating to protection zones and management areas (fencing, diversion channels, sewer line construction, and grouting, etc.) are found in R309-515. After the source is constructed a DWSP Plan must be developed, submitted, and implemented accordingly.

(2) Preliminary Evaluation Report for New Sources of Drinking Water - PERs shall cover all four zones or the entire management area. PERs should be developed in accordance with the "Standard Report Format for New Wells and Springs." This document may be obtained from DDW. PWSs shall include the following four sections in each PER:

(a) Delineation Report for Estimated DWSP Zones - The same requirements apply as in R309-600-9(5)(6), except that the hydrogeologic data for the PER must be developed using the best available data which may be obtained from: surrounding wells, published information, or surface geologic mapping. PWSs must use the Preferred Delineation Procedure to delineate protection zones for new wells. The Delineation Report for Estimated DWSP Zones shall be stamped

and signed by a professional geologist or professional engineer unless the Optional Two-Mile Radius Delineation Procedure is used for a new spring.

(b) Inventory of Potential Contamination Sources and Identification and Assessment of Controls - The same requirements apply as in R309-600-10(1) and (2). Additionally, the PER must demonstrate that the source meets the following requirements:

(i) Protection Areas Delineated using the Preferred Delineation Procedure in Protected Aquifers - A PWS shall not locate a new ground-water source of drinking water where an uncontrolled potential contamination source or a pollution source exists within zone one.

(ii) Protection Areas Delineated using the Preferred Delineation Procedure in Unprotected Aquifers - A PWS shall not locate a new ground-water source of drinking water where an uncontrolled potential contamination source or an uncontrolled pollution source exists within zone one. Additionally, a new ground-water source of drinking water may not be located where a pollution source exists within zone two unless the pollution source implements design standards which prevent contaminated discharges to ground water.

(iii) Management Areas Delineated using the Optional Two-Mile Radius Delineation Procedure - A PWS shall not locate a new spring where an uncontrolled potential contamination source or a pollution source exists within zone one. Additionally, a new spring may not be located where a pollution source exist within the management area unless: a hydrogeologic report in accordance with R309-600-9(5)(6)(b)(ii) which verifies that it does not impact the spring; or the pollution source implements design standards which prevent contaminated discharges to ground water.

(c) Land Ownership Map - A land ownership map which includes all land within zones one and two or the entire management area. Additionally, include a list which exclusively identifies the land owners in zones one and two or the management area, the parcel(s) of land which they own, and the zone in which they own land. A land ownership map and list are not required if ordinances are used to protect these areas.

(d) Land Use Agreements, Letters of Intent, or Zoning Ordinances - Land use agreements which meet the requirements of the definition in R309-600-6(1)(p). Zoning ordinances which are already in effect or letters of intent may be substituted for land use agreements; however, they must accomplish the same level of protection that is required in a land use agreement. Letters of intent must be notarized, include the same language that is required in land use agreements, and contain the statement that "the owner agrees to record the land use agreement in the county recorder's office, if the source proves to be an acceptable drinking

water source." The PWS shall not introduce a new source into its system until copies of all applicable recorded land use agreements are submitted to DDW.

(3) Sewers Within DWSP Zones and Management Areas - Sewer lines may not be located within zones one and two or a management area unless the criteria identified below are met. If sewer lines are located or planned to be located within zones one and two or a management area, the PER must demonstrate that they comply with these criteria. Sewer lines that comply with these criteria may be assessed as adequately controlled potential contamination sources.

(a) Unprotected Aquifers -

(i) Zone one - sewer lines and laterals shall be at least 50 feet from the wellhead or margin of the collection area, and be constructed in accordance to R309-515-6.

(ii) Zone two - all sewer lines and laterals within zone two or a management area shall be constructed in accordance with R309-515-6.

(b) Protected Aquifers – in zone one all sewer lines and laterals shall be constructed in accordance to R309-515-6, and shall be at least 10 feet from the wellhead or margin of the collection area.

(4) Use waivers for the VOC and pesticide parameter groups may be issued if the inventory of potential contamination sources indicates that the chemicals within these parameter groups are not used, disposed, stored, transported, or manufactured within zones one, two, and three or the management area.

(5) Replacement Wells - A PER is not required for proposed wells, if the PWS receives written notification from the Executive Secretary that the well is classified as a replacement well. The PWS must submit a letter requesting that the well be classified as a replacement well and include documentation to show that the conditions required in R309-600-6(1)(y) are met. If a proposed well is classified as a replacement well, the PWS is still required to submit and obtain written approval for all other information as required in:

(a) DWSP Plan for New Sources of Drinking Water (refer to R309-600-13(6), and

(b) the Outline of Well Approval Process (refer to R309-515-6(5)).

(6) DWSP Plan for New Sources of Drinking Water - The PWS shall submit a DWSP Plan in accordance with R309-600-7(1) for any new ground-water source of drinking water within one year after the date of the Executive Secretary's concurrence letter for the PER. In developing this DWSP Plan, PWSs shall refine the information in the PER by applying any new, as-constructed characteristics of the source (i.e., pumping rate, aquifer test, etc.).

R309-600-14. Contingency Plans.

PWSs shall submit a Contingency Plan which includes all sources of drinking water for their entire water system to DDW concurrently with the submission of their first DWSP Plan. Guidance for developing Contingency Plans may be found in the "Source Protection User's Guide for Ground-Water Sources." This document may be obtained from DDW.

R309-600-15. Public Notification.

A PWSs consumers must be notified that its DWSP plans are available for their review. This notification must be released to the public by December 31, 2003. Public notifications shall address all of the PWS's sources and include the following:

(a) A discussion of the general types of potential contamination sources within the protection zones;

(b) an analysis that rates the system's susceptibility to contamination as low, medium, or high; and

(c) a statement that the system's complete DWSP plans are available to the public upon request.

Examples of means of notifying the public and examples of public notification material are discussed in the "Source Protection User's Guide for Ground-Water Sources" which may be obtained from DDW.

R309-600-16. Monitoring Reduction Waivers.

(1) Three types of monitoring waivers are available to PWSs. They are: a) reliably and consistently, b) use, and c) susceptibility. The criteria for establishing a reliably and consistently waiver is set forth in R309-205. The criteria for use and susceptibility waivers follow.

(2) If a source's DWSP plan is due according to the schedule in R309-600-3, and is not submitted to DDW, its use and susceptibility waivers for the VOC and pesticide parameter groups (refer to R309-205-6(1)(e) and (f) and R309-205-6(2)(h) and (i)) will expire unless an exception (refer to R309-600-4) for a new due date has been granted. Additionally, current use and susceptibility waivers for the VOC, pesticide and unregulated parameter groups will expire upon review of a DWSP plan, if these waivers are not addressed in the plan. Monitoring reduction waivers must be renewed every six years at the time the PWSs Updated DWSP Plans are due and be addressed therein.

(3) Use Waivers - If the chemicals within the VOC and/or pesticide parameter group(s) (refer to R309-200 table 200-3 and 200-2) have not been used, disposed, stored, transported, or manufactured within the past five years within zones one, two, and three, the source may be eligible for a use waiver. To qualify for a VOC and/or pesticide use waiver, a PWS must complete the following two steps:

(a) List the chemicals which are used, disposed, stored, transported, and manufactured at each potential contamination source within zones one, two, and three where the use of the chemicals within the VOC and pesticide parameter groups are likely; and

(b) submit a dated statement which is signed by the system's designated person that none of the VOCs and pesticides within these respective parameter groups have been used, disposed, stored, transported, or manufactured within the past five years within zones one, two, and three.

(4) Susceptibility Waivers - If a source does not qualify for use waivers, and if reliably and consistently waivers have not been issued, it may be eligible for susceptibility waivers. Susceptibility waivers tolerate the use, disposal, storage, transport, and manufacture of chemicals within zones one, two, and three as long as the PWS can demonstrate that the source is not susceptible to contamination from them. To qualify for a VOC and/or pesticide susceptibility waiver, a PWS must complete the following steps:

(a) Submit the monitoring results of at least one applicable sample from the VOC and/or pesticide parameter group(s) that has been taken within the past six years. A non-detectable analysis for each chemical within the parameter group(s) is required;

(b) submit a dated statement from the designated person verifying that the PWS is confident that a susceptibility waiver for the VOC and/or pesticide parameter group(s) will not threaten public health; and

(c) verify that the source is developed in a protected aquifer, as defined in R309-600-6(1)(x), and have a public education program which addresses proper use and disposal practices for pesticides and VOCs which is described in the management sections of the DWSP plan.

(5) Special Waiver Conditions - Special scientific or engineering studies or best management practices may be developed to support a request for an exception to paragraph R309-600-16(4)(c) due to special conditions. These studies must be approved by the Executive Secretary before the PWS begins the study. Special waiver condition studies may include:

(a) geology and construction/grout seal of the well to demonstrate geologic protection;

(b) memoranda of agreement which addresses best management practices for VOCs and/or pesticides with industrial, agricultural, and commercial facilities which use, store, transport, manufacture, or dispose of the chemicals within these parameter groups;

(c) public education programs which address best management practices for VOCs and/or pesticides;

(d) contaminant quantities;

(e) affected land area; and/or

(f) fate and transport studies of the VOCs and/or pesticides which are listed as hazards at the PCSs within zones one, two, and three, and any other conditions which may be identified by the PWS and approved by the Executive Secretary.

KEY: drinking water, environmental health
November 15, 2012 19-4-104(1)(a)(iv)
Notice of Continuation April 14, 2005

R309-605. Source Protection: Drinking Water Source Protection for Surface Water Sources.

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R309-605. Source Protection: Drinking Water Source Protection for Surface Water Sources.

R309-605-1. Purpose.

Public Water Systems (PWSs) are responsible for protecting their sources of drinking water from contamination. R309-605 sets forth minimum requirements to establish a uniform, statewide program for implementation by PWSs to protect their surface water sources of drinking water. PWSs are encouraged to enact more stringent programs to protect their sources of drinking water if they decide additional measures are necessary.

R309-605 applies to PWSs which obtain surface water prior to treatment and distribution and to PWSs obtaining water from ground-water sources which are under the direct influence of surface water. However, compliance with this rule is voluntary for public (transient) non-community water systems to the extent that they are using existing surface water sources of drinking water.

R309-605-2. Authority.

Under authority of Subsection 19-4-104(1)(a)(iv), the Drinking Water Board adopts this rule which governs the protection of surface sources of drinking water.

R309-605-3. Definitions.

(1) The following terms are defined for the purposes of this rule:

(a) "Controls" means the codes, ordinances, rules, and regulations that regulate a potential contamination source. "Controls" also means physical controls which may prevent contaminants from migrating off of a site and into surface or ground water. Controls also means negligible quantities of contaminants.

(b) "Division" means Division of Drinking Water.

(c) "DWSP Program" means the program and associated plans to protect drinking water sources from contaminants.

(d) "DWSP Zone" means the surface and subsurface area surrounding a surface source of drinking water supplying a PWS, over which or through which contaminants are reasonably likely to move toward and reach the source.

(e) "Designated person" means the person appointed by a PWS to ensure that the requirements of R309-605 are met.

(f) "Executive Secretary" means the individual appointed pursuant to Section 19-4-106 of the Utah Safe Drinking Water Act.

(g) "Existing surface water source of drinking water" means a public supply surface water source for which plans and specifications were submitted to DDW on or before June 12, 2000.

(h) "Intake", for the purposes of surface water drinking water source protection, means the device used to divert surface water and also the conveyance to the point immediately preceding treatment, or, if no treatment is provided, at the entry point to the distribution system.

(i) "Land management strategies" means zoning and non-zoning controls which include, but are not limited to, the following: zoning and subdivision ordinances, site plan reviews, design and operating standards, source prohibitions, purchase of property and development rights, public education programs, ground-water monitoring, household hazardous waste collection programs, water conservation programs, memoranda of understanding, and written contracts and agreements.

(j) "New surface water source of drinking water" means a public supply surface water source of drinking water for which plans and specifications are submitted to the Executive Secretary after June 12, 2000.

(k) "Nonpoint source" means any area or conveyance not meeting the definition of point source.

(l) "Point of diversion" (POD) is the location at which water from a surface source enters a piped conveyance, storage tank, or is otherwise removed from open exposure prior to treatment.

(m) "Point source" means any discernible, confined, and discrete location or conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, animal feeding operation with more than ten animal units, landfill, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture.

(n) "Pollution source" means point source discharges of contaminants to surface water or potential discharges of the liquid forms of "extremely hazardous substances" which are stored in containers in excess of "applicable threshold planning quantities" as specified in the Emergency Planning and Community Right-to-Know Act (EPCRA),42 U.S.C. 11001 et seq. (1986). Examples of possible pollution sources include, but are not limited to, the following: storage facilities that store the liquid forms of extremely hazardous substances, septic tanks, drain fields, class V underground injection wells, landfills, open dumps,

land filling of sludge and septage, manure piles, salt piles, pit privies, drain lines, and animal feeding operations with more than ten animal units. The following definitions are part of R309-605 and clarify the meaning of "pollution source:"

> (i) "Animal feeding operation" means a lot or facility where the following conditions are met: animals have been or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12 month period, and crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Two or more animal feeding operations under common ownership are considered to be a single feeding operation if they adjoin each other, if they use a common area, or if they use a common system for the disposal of wastes.
>
> (ii) "Animal unit" means a unit of measurement for any animal feeding operation calculated by adding the following numbers; the number of slaughter and feeder cattle multiplied by 1.0, plus the number of mature dairy cattle multiplied by 1.4, plus the number of swine weighing over 55 pounds multiplied by 0.4, plus the number of sheep multiplied by 0.1, plus the number of horses multiplied by 2.0.
>
> (iii) "Extremely hazardous substances" means those substances which are identified in the Sec. 302(EHS) column of the "TITLE III LIST OF LISTS - Consolidated List of Chemicals Subject to Reporting Under SARA Title III," (EPA 550-B-96-015). A copy of this document may be obtained from: NCEPI, PO Box 42419, Cincinnati, OH 45202. Online ordering is also available at: http://www.epa.gov/ncepihom/orderpub.html.

(o) "Potential contamination source" means any facility or site which employs an activity or procedure or stores materials which may potentially contaminate ground-water or surface water. A pollution source is also a potential contamination source.

(p) "PWS" means a public water system affected by this rule, as described in R309-605-1.

(q) "Surface water" means all water which is open to the atmosphere and subject to surface runoff (see also R309-515-5(1)).

(r) "Susceptibility" means the potential for a PWS to draw water contaminated above a demonstrated background water quality concentration through any combination of the following pathways: geologic strata and overlying soil, direct discharge, overland flow, upgradient water, cracks/fissures in or open areas of the surface water intake and/or the pipe/conveyance between the intake and the water distribution system. Susceptibility is determined at the point immediately

preceding treatment or, if no treatment is provided, at the entry point to the system.

(s) "Watershed" means the topographic boundary, up to the state's border, that is the perimeter of the catchment basin that provides water to the intake structure.

R309-605-4. Implementation.

(1) Existing Surface Water Sources - Each PWS shall submit a Drinking Water Source Protection (DWSP) Plan to the Division of Drinking Water (Division) in accordance with R309-605-7 for each of its existing surface water sources according to the following schedule.

TABLE
Schedule for DWSP Plan Submittal

Population served by PWS	**DWSP Plans due by**
Greater than 10,000	December 31, 2001
3,300 to 10,000	May 6, 2002
Few than 3,300	May 6, 2003

(2) New surface water sources - Each PWS shall submit a Preliminary Evaluation Report (PER) in accordance with R309-605-9 for each of its new surface water sources to the Executive Secretary.

R309-605-5. Exceptions.

(1) Exceptions to the requirements of R309-605 or parts thereof may be granted by the Executive Secretary to a PWS if, due to compelling factors (which may include economic factors), a PWS is unable to comply with these requirements, and the granting of an exception will not result in an unreasonable risk to health.

(2) The Executive Secretary may prescribe a schedule by which the PWS must come into compliance with the requirements of R309-605.

R309-605-6. Designated Person.

(1) Each PWS shall designate a person responsible for demonstrating the PWS's compliance with these rules. A designated person shall be appointed and reported in writing to the Executive Secretary by each PWS within 180 days of the effective date of R309-605. The name, address and telephone number of the designated person shall be included in each DWSP Plan and PER that is submitted to the Executive Secretary, and in all other correspondence with the Division.

(2) Each PWS shall notify the Executive Secretary in writing within 30 days of any changes in the appointment of a designated person.

R309-605-7. Drinking Water Source Protection (DWSP) for Surface Sources.

(1) DWSP Plans

(a) Each PWS shall develop, submit, and implement a DWSP Plan for each of its surface water sources of drinking water.

(i) Recognizing that more than one PWS may jointly use a source from the same or nearby diversions, the Executive Secretary encourages collaboration among such PWSs with joint use of a source in the development of a DWSP plan for that source. PWSs who jointly submit an acceptable DWSP plan per R309-605-7 for one surface water source above common point(s) of diversion, will be considered to have met the requirement of R309-605-7(1)(a). The deadline from R309-605-4(1) that would apply to such a collaboration would be associated with the largest population served by the individual parties to the agreement.

(b) Required Sections for DWSP Plans - DWSP Plans should be developed in accordance with the "Standard Report Format for Surface Sources". This document may be obtained from the Division. DWSP Plans must include the following eight sections:

(i) DWSP Delineation Report - A DWSP Delineation Report in accordance with R309-605-7(3) is the first section of a DWSP Plan.

(ii) Susceptibility Analysis and Determination - A susceptibility analysis and determination in accordance with R309-605-7(4) is the second section of a DWSP report.

(iii) Management Program to Control Each Preexisting Potential Contamination Source - Land management strategies to control each not adequately controlled preexisting potential contamination source in accordance with R309-605-7(5) is the third section of a DWSP Plan.

(iv) Management Program to Control or Prohibit Future Potential Contamination Sources - Land management strategies for controlling or prohibiting future potential contamination sources is the fourth section of a DWSP Plan. This must be in accordance with R309-605-7(6), must be

consistent with the general provisions of this rule, and implemented to an extent allowed under the PWS's authority and jurisdiction.

(v) Implementation Schedule - The implementation schedule is the fifth section of a DWSP Plan. Each PWS shall develop a step-by-step implementation schedule which lists each of its proposed land management strategies with an implementation date for each strategy.

(vi) Resource Evaluation - The resource evaluation is the sixth section of a DWSP Plan. Each PWS shall assess the financial and other resources which may be required for it to implement each of its DWSP Plans and determine how these resources may be acquired.

(vii) Recordkeeping - Recordkeeping is the seventh section of a DWSP Plan. Each PWS shall document changes in each of its DWSP Plans as they are updated to show significant changes in conditions in the protection zones. As a DWSP Plan is executed, the PWS shall document any land management strategies that are implemented. These documents may include any of the following: ordinances, codes, permits, memoranda of understanding, public education programs, and so forth.

(viii) Public Notification - A method for, schedule for and example of the means for notifying the public water system's customers and consumers regarding the drinking water source water assessment and the results of that assessment is the last section of a DWSP plan. This must be in accordance with R309-605-7(7).

(ix) Existing watershed or resource management plans - In lieu of some or all of the report sections described in R309-605-7(1)(b), the PWS may submit watershed or resource management plans that in whole or in part meet the requirements of this rule. Such plans shall be submitted to the Executive Secretary with a cover letter that fully explains how they meet the requirements of the current DWSP rules. Any required section described in R309-605-7(1)(b) that is not covered by the watershed or resource management plan must be addressed and submitted jointly. The watershed or resource management plans will be subject to the same review and approval process as any other section of the DWSP plan.

(c) DWSP Plan Administration - DWSP Plans shall be submitted, corrected, retained, implemented, updated, and revised according to the following:

(i) Submitting DWSP Plans - Each PWS shall submit a DWSP Plan to the Executive Secretary in accordance with the schedule in R309-605-4(2) for each of its surface water sources of drinking water (a joint development and submittal of a DWSP plan is acceptable for PWSs with the joint use of a source, per R309-605-7(1)(a)(i).)

(ii) Correcting Deficiencies - Each PWS shall correct any deficiencies in a disapproved DWSP Plan and resubmit it to the Executive Secretary within 90 days of the disapproval date.

(iii) Retaining DWSP Plans - Each PWS shall retain on its premises a current copy of each of its DWSP Plans. DWSP Plans shall be made available to the public upon request.

(iv) Implementing DWSP Plans - Each PWS shall begin implementing each of its DWSP Plans in accordance with its schedule in R309-605-7(1)(b)(v), within 180 days after submittal if they are not disapproved by the Executive Secretary.

(v) Updating and Resubmitting DWSP Plans - Each PWS shall review and update its DWSP Plans as often as necessary to ensure that they show current conditions in the DWSP zones, but at least annually after the original due date (see R309-605-4(1)). Updated plans also document the implementation of land management strategies in the recordkeeping section. Updated DWSP Plans will be resubmitted to the Executive Secretary every six years from their original due date, which is described in R309-605-4.

(vi) Revising DWSP Plans - Each PWS shall submit a revised DWSP Plan to the Executive Secretary within 180 days after the reconstruction or redevelopment of any surface water source of drinking water which causes changes in source construction, source development, hydrogeology, delineation, potential contamination sources, or proposed land management strategies.

(2) DWSP Plan Review.

(a) The Executive Secretary shall review each DWSP Plan submitted by PWSs and "concur," "conditionally concur" or "disapprove" the plan.

(b) The Executive Secretary may "disapprove" DWSP Plans for good cause, including any of the following reasons:

(i) A DWSP Plan that is missing the delineation report or any of the information and data required in it (refer to R309-605-7(3));

(ii) An inaccurate Susceptibility Analysis or a DWSP Plan that is missing this report or any of the information required in it (refer to R309-605-7(4));

(iii) An inaccurate Prioritized Inventory of Potential Contamination Sources or a DWSP Plan that is missing this report or any of the information required in it (refer to R309-605-7(4)(c));

(iv) An inaccurate assessment of current controls (refer to R309-605-7(4)(a)(iii)(B));

(v) A missing or incomplete Management Program to Control Each Preexisting Potential Contamination Source which has been assessed as "not adequately controlled" by the PWS (refer to R309-605-7(5));

(vi) A missing or incomplete Management Program to Control or Prohibit Future Potential Contamination Sources (refer to R309-605-7(6));

(vii) A missing Implementation Schedule, Resource Evaluation, Recordkeeping Section, or Contingency Plan (refer to R309-605-7(1)(b)(v-vii) and R309-605-9);

(viii) A missing or incomplete Public Notification Section (refer to R309-605-7(7).

(c) If the Executive Secretary conditionally concurs with a DWSP Plan, the PWS must implement the conditions and report compliance the next time the DWSP Plan is due and submitted to the Executive Secretary.

(3) Delineation of Protection Zones

(a) The delineation section of the DWSP plan for surface water sources may be obtained from the Division upon request. A delineation section prepared and provided by the Division would become the first section of the submittal from the PWS. The delineation section provided by the Division will consist of a map or maps showing the limits of the zones described in R309-605-7(3)(b)(i-iv), and will include an inventory of potential contamination sources on record in the Division's Geographic Information System.

(b) Alternatively, the PWS may provide their own delineation report. Such a submittal must either describe the zones as defined in R309-605-7(3)(b)(i-iv), or must comply with the requirements and definitions of R309-605-7(3)(c). The delineation report must include a map or maps showing the extent of the zones.

(i) Zone 1:

(A) Streams, rivers and canals: zone 1 encompasses the area on both sides of the source, 1/2 mile on each side measured laterally from the high water mark of the source (bank full), and from 100

feet downstream of the POD to 15 miles upstream, or to the limits of the watershed or to the state line, whichever comes first. If a natural stream or river is diverted into an uncovered canal or aqueduct for the purpose of delivering water to a system or a water treatment facility, that entire canal will be considered to be part of zone 1, and the 15 mile measurement upstream will apply to the stream or river contributing water to the system from the diversion.

(B) Reservoirs or lakes: zone 1 is considered to be the area 1/2 mile from the high water mark of the source. Any stream or river contributing to the lake/reservoir will be included in zone 1 for a distance of 15 miles upstream, and 1/2 mile laterally on both sides of the source. If a reservoir is diverted into an uncovered canal or aqueduct for the purpose of delivering water to a system or a water treatment facility, that entire canal will be considered to be part of zone 1, and the 15 mile measurement upstream will apply to the reservoir and tributaries contributing water to the system.

(ii) Zone 2: Zone 2 is defined as the area from the end of zone 1, and an additional 50 miles upstream (or to the limits of the watershed or to the state line, whichever comes first), and 1000 feet on each side measured from the high water mark of the source.

(iii) Zone 3: Zone 3 is defined as the area from the end of zone 2 to the limits of the watershed or to the state line, whichever comes first, and 500 feet on each side measured from the high water mark of the source.

(iv) Zone 4: Zone 4 is defined as the remainder of the area of the watershed (up to the state line, if applicable) contributing to the source that does not fall within the boundaries of zones 1 through 3.

(v) Special case delineations:

(A) Basin Transfer PODs: Where water supplies are received from basin transfers, the water from the extraneous basin will be treated as a separate source, and will be subject to its own DWSP plan, starting from zone 1 at the secondary POD.

(c) If the PWS is able to demonstrate that a different zone configuration is more protective than those defined in R309-605-7(3)(b), that different configuration may be used upon prior review and approval by the Executive Secretary. An explanation of the method used to obtain and establish the dimensions of the zones must be provided. The delineation report must include a map or maps showing the extent of the zones. The entire watershed boundary contributing to a source must be included in the delineation.

(4) Susceptibility Analysis and Determination:

(a) Susceptibility Analysis:

(i) Structural integrity of the intake: The PWS will evaluate the structural integrity of the intake to ensure compliance with the existing source development rule (R309-515) on a pass or fail basis. The pass-fail rating will be determined by whether the intake meets minimum rule requirements, and whether the physical condition of the intake is adequate to protect the intake from contamination events. The integrity evaluation includes any portion of the conveyance from the point of diversion to the distribution systems that is open to the atmosphere or is otherwise vulnerable to contamination, including distribution canals, etc.

(ii) Sensitivity of Natural Setting: The PWS will evaluate the sensitivity of the source based on physiographic and/or hydrogeologic factors. Factors influencing sensitivity may include any natural or man-made feature that increases or decreases the likelihood of contamination. Sensitivity does not address the question of whether contamination is present in the watershed or recharge area.

(iii) Assessment of management of potential contamination sources:

(A) Potential Contamination Source Inventory

(I) Each PWS shall identify and list all potential contamination sources within DWSP zones 1, 2 and 3, as applicable for individual sources. The name and address of each non-residential potential contamination source is required, as well as a list of the chemical, biological, and/or radiological hazards associated with each potential contamination source. Additionally, each PWS shall identify each potential contamination source as to its location in zone one, two, or three and plot it on the map required in R309-605-7(3)(a and b). The PWS may rely on the inventory provided by the Division for zone 4.

(II) List of Potential Contamination Sources - A List of Potential Contamination Sources may be obtained from the Division. This list may be used by PWSs as an introduction to inventorying potential contamination sources within their DWSP zones. The list is not intended to be all-inclusive.

(III) Refining, Expanding, Updating, and Verifying Potential Contamination Sources - Each PWS shall update its list of potential contamination sources to show current

conditions within DWSP zones according to R309-605-7(1)(c)(v). This includes adding potential contamination sources which have moved into DWSP zones, deleting potential contamination sources which have moved out, improving available data about potential contamination sources, and all other appropriate refinements.

(B) Identification and Assessment of Controls: The PWS will identify and assess the hazards at each potential contamination source, including those in the inventory provided by the Division that are located in zone 4, as "adequately controlled" or "not adequately controlled".

(I) If controls are not identified, the potential contamination source will be considered "not adequately controlled." Additionally, if the hazards at a potential contamination source cannot be or are not identified, the potential contamination source must be assessed as "not adequately controlled."

(II) Types of controls: For each hazard deemed to be controlled, one of the following controls shall be identified: regulatory, best management/pollution prevention, or physical controls. Negligible quantities of contaminants are also considered a control. The assessment of controls will not be considered complete unless the controls are completely evaluated and discussed in the DWSP report, using the following criteria:

Regulatory Controls - Identify the enforcement agency and verify that the hazard is being regulated by them; cite and/or quote applicable references in the regulation, rule or ordinance which pertain to controlling the hazard; explain how the regulatory controls affect the potential for surface water contamination; assess the hazard; and set a date to reassess the hazard. For assistance in identifying regulatory controls, refer to the "Source Protection User's Guide" Appendix D for a list of government agencies and the programs they administer to control potential contamination sources. This guide may be obtained from the Division.

Best Management/Pollution Prevention Practice Controls - List the specific best management/pollution prevention practices which have been implemented by potential contamination source management to control the hazard

and indicate that they are willing to continue the use of these practices; explain how these practices affect the potential for surface water contamination; assess the hazard; and set a date to reassess the hazard.

Physical Controls - Describe the physical control(s) which have been constructed to control the hazard; explain how these controls affect the potential for contamination; assess the hazard; and set a date to reassess the hazard.

Negligible Quantity Control - Identify the quantity of the hazard that is being used, disposed, stored, manufactured, and/or transported; explain why this amount is a negligible quantity; assess the hazard; and set a date to reassess the hazard.

(III) PWSs may assess controls on Potential Contamination Sources collectively, when the Potential Contamination Sources have similar characteristics, or when the Potential Contamination Sources are clustered geographically. Examples may include, but are not limited to, abandoned mines that are part of the same mining districts, underground storage tanks that are in the same zone, or leaking underground storage tanks in the same city. However, care should be taken to avoid collectively assessing Potential Contamination Sources to the extent that the assessments become meaningless. The Executive Secretary may require an individual assessment for a Potential Contamination Source if the Executive Secretary determines that the collective assessment does not adequately assess controls.

(C) A potential contamination source which is covered by a permit or approval under one of the regulatory programs listed below shall be considered to be adequately controlled unless otherwise determined by the Executive Secretary. The PWS must provide documentation establishing that the Potential Contamination Source is covered by the regulatory program. For all other state regulatory programs, the PWS's assessment is subject to review by the Executive Secretary; as a result, a PWS's DWSP Plan may be disapproved if the Executive Secretary does not concur with its assessment(s).

(I) The Utah Ground-Water Quality Protection program established by Section 19-5-104 and Rule R317-6;

(II) Closure plans or Part B permits under authority of the Resource Conservation and Recovery Act (RCRA) of 1984 regarding the monitoring and treatment of ground-water;

(III) The Utah Pollutant Discharge Elimination System (UPDES) established by Section 19-5-104 and Rule R317-8; at the discretion of the PWS, this may include Confined Animal feeding Operations/Animal Feeding Operations (CAFO/AFO) assessed under the Utah DWQ CAFO/AFO Strategy.

(IV) The Underground Storage Tank Program established by Section 19-6-403 and Rules R311-200 through R311-208; and

(V) the Underground Injection Control (UIC) Program for classes I-IV established by Sections 19-5-104 and 40-6-5 and Rules R317-7 and R649-5.

(b) Susceptibility determination:

(i) The PWS will assess the drinking water source for its susceptibility relative to each potential contamination source. The determination will be based on the following four factors: 1) the structural integrity of the intake, 2) the sensitivity of the natural setting, 3) whether a Potential Contamination Source is considered controlled or not, and 4) how the first three factors are interrelated. The PWS will provide an explanation of the method or judgement used to weigh the first three factors against each other to determine susceptibility.

(ii) Additionally, each drinking water source will be assessed by the PWS for its overall susceptibility to potential contamination events. This will result in a qualitative assessment of the susceptibility of the drinking water source to contamination. This assessment of overall susceptibility allows the PWS and others to compare the susceptibility of one drinking water source to another.

(iii) Each surface water drinking water source in the state of Utah is initially considered to have a high susceptibility to contamination, due to the intrinsic unprotected nature of surface water sources. An assumption of high susceptibility will be used by the Executive Secretary unless a PWS or a group of PWSs demonstrates otherwise, per R309-605, and receives concurrence from the Executive Secretary under R309-605-7(2).

(c) Prioritized Potential Contamination Source Inventory: The PWS will prepare a prioritized inventory of potential contamination sources based on the

susceptibility determinations in R309-605-7(4)(b)(i). The inventory will rank potential contamination sources based on the degree of threat posed to the drinking water source as determined in R309-605-7(4)(b)(i).

(5) Management Program to Control Each Preexisting Potential Contamination Source.

(a) PWSs are not required to plan and implement land management strategies for potential contamination source hazards that are assessed as "adequately controlled."

(b) With the first submittal of the DWSP Plan, PWSs shall include management strategies to reduce the risk of contamination from, at a minimum, each of the three highest priority uncontrolled Potential Contamination Sources in the protection zones for the source. The Executive Secretary may require land management strategies for additional Potential Contamination Sources to assure adequate protection of the source. A management plan may be for one specific Potential Contamination Source (i.e., a sewage lagoon discharging into a stream), or for a group of similar or related Potential Contamination Sources that were assessed jointly under R309-605-7(4)(a)(iii)(B)(III) (i.e., one management plan for septic systems within one residential development would be acceptable, and would count as one of the three Potential Contamination Source management strategies).

PWSs shall plan land management strategies to control preexisting uncontrolled potential contamination sources in accordance with their existing authority and jurisdiction. Land management strategies must be consistent with the provisions of R309-605, designed to control or reduce the risk of potential contamination, and may be regulatory or non-regulatory. Land management strategies must be implemented according to the schedule required in R309-605-7(1)(b)(v).

(c) PWSs with overlapping protection zones may cooperate in controlling a particular preexisting potential contamination source if one PWS will agree to take the lead in planning and implementing land management strategies. The remaining PWS(s) will assess the preexisting potential contamination source as "adequately controlled."

(d) At each six year cycle for revising and resubmitting the DWSP Plan, under the schedule in R309-605-7(1)(c)(v), the PWS shall prioritize their inventory again, and shall propose a management program to control preexisting Potential Contamination Sources for the three highest priority Potential Contamination Sources, which may include uncontrolled Potential Contamination Sources not previously managed. The PWS shall also continue existing management programs, unless justification is provided that demonstrates that a Potential Contamination Source that was previously managed is now considered controlled.

(6) Management Program to Control or Prohibit Future Potential Contamination Sources for Existing Drinking Water Sources.

(a) PWSs shall plan land management strategies to control or prohibit future potential contamination sources within each of its DWSP zones consistent with the provisions of R309-605 and to the extent allowed under its authority and jurisdiction. Land management strategies must be designed to control or reduce the risk of potential contamination and may be regulatory or non-regulatory. Additionally land management strategies must be implemented according to the schedule required in R309-605-7(1)(b)(v).

(b) Protection areas may extend into neighboring cities, towns, and counties. Since it may not be possible for some PWSs to enact regulatory land management strategies outside of their jurisdiction, except for municipalities as described below, it is recommended that these PWSs contact their neighboring cities, towns, and counties to see if they are willing to implement protective ordinances to prevent surface water contamination under joint management agreements.

(c) Cities and towns have extraterritorial jurisdiction in accordance with Section 10-8-15 of the Utah Code Annotated to enact ordinances to protect a stream or "source" from which their water is taken... " for 15 miles above the point from which it is taken and for a distance of 300 feet on each side of such stream...."

(d) Zoning ordinances are an effective means to control potential contamination sources that may want to move into protection areas. They allow PWSs to prohibit facilities that would discharge contaminants directly to surface water. They also allow PWSs to review plans from potential contamination sources to ensure there will be adequate spill protection and waste disposal procedures, etc. If zoning ordinances are not used, PWSs must establish a plan to contact potential contamination sources individually as they move into protection areas, identify and assess their controls, and plan land management strategies if they are not adequately controlled.

(7) Public Notification:

Within their DWSP report, each PWS shall specify the method and schedule for notifying their customers and consumers that an assessment of their surface water source has been completed and what the results of that assessment are. Each PWS shall provide the proposed public notification material as an appendix to the DWSP report. The public notification material shall include a discussion of the general geologic and physical setting of the source, the sensitivity of the setting, general types of potential contamination sources in the area, how susceptible the drinking water source is to potential contamination and a map showing the location of the drinking water source and

generalized areas of potential concern (it is not mandatory to show the location of the intake itself). The public notification material will be in plain English. The purpose of this public notification is to advise the public regarding how susceptible their drinking water source is to potential contamination sources. Examples of means of notifying the public, and examples of acceptable public notification materials, are available from the Division. The public notification materials must be approved by the Executive Secretary prior to distribution.

R309-605-8. DWSP for Ground-Water Sources Under the Direct Influence of Surface Water Sources.

(1) DWSP for ground-water sources under the direct influence of surface water sources will be accomplished through delineation of both the ground-water and surface water contribution areas. The requirements of R309-600 will apply to the ground-water portion, and the requirements of R309-605 will apply to the surface water portion, except that the schedule for such DWSP plans under this section will be based on the schedule shown in R309-605-4(1).

R309-605-9. New Surface Water Sources of Drinking Water.

(1) Prior to constructing a new surface water source of drinking water, each PWS shall develop a preliminary evaluation report (PER) which demonstrates that the source location has been chosen such that the number of uncontrolled sources in zones 1 and 2 is minimized. If the source water is not currently classified as Class 1C under UAC R317-2, the PWS must request such a classification from the Water Quality Board for zones 1 and 2. The PWS must also request that the source water be categorized as High Quality Waters - Category 1 or 2 under UAC R317-2-3 (Antidegradation Policy), if applicable. In addition, engineering information in accordance with R309-515-4 and R309-515-5 (general source development and surface water source development requirements) must be submitted to the Executive Secretary concurrent with the PER. A complete DWSP plan is required, one year after approval of the PER and after construction of the source intake, following the requirements of R309-605-7.

(2) Preliminary Evaluation Report (PER) for New Sources of Drinking Water - PERs shall cover all four zones. PERs should be developed in accordance with the "Standard Report Format for New Surface Sources." This document may be obtained from the Division. PWSs shall include the following four sections in each PER:

(a) Delineation Report for Estimated DWSP Zones - The same requirements apply as in R309-605-7(3).

(b) Susceptibility Analysis and determination (including inventory)- The same requirements apply as in R309-605-7(4).

(c) Land Use Map - A land use map which includes all land within zones one and two and the primary use of the land (residential, commercial, industrial, recreational, crops, animal husbandry, etc). Existing maps or GIS data may be used to satisfy this requirement.

(d) Documentation of Division of Water Quality classification of source water - with reference to R317-2, provide documentation of the classification of the source waters by the Water Quality Board/Division of Water Quality (see also R309-605-9(1)), and of any associated petition for a change in classification.

(3) DWSP Plan for New Sources of Drinking Water - The PWS shall submit a DWSP Plan in accordance with R309-605-4 for any new surface water source of drinking water within one year after the date of the Executive Secretary's concurrence letter with the PER. In developing this DWSP Plan, PWSs shall refine the information in the PER by applying any new characteristics of the source.

R309-605-10. Contingency Plans.

PWSs shall submit a Contingency Plan which includes all sources of drinking water (groundwater and surface water) for their entire water system to the Executive Secretary concurrently with the submission of their first DWSP Plan. The Contingency Plan shall address emergency response, rationing, water supply decontamination, and development of alternative sources.

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R309-700. Financial Assistance: State Drinking Water State Revolving Fund (SRF) Loan Program.

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R309-700. Financial Assistance: State Drinking Water State Revolving Fund (SRF) Loan Program.

R309-700-1. Purpose.

This rule establishes criteria for financial assistance to public drinking water systems in accordance with Title 73, Chapter 10c, Utah Code Annotated using funds made available by the Utah legislature from time to time for this purpose.

R309-700-2. Statutory Authority.

The authority for the Department of Environmental Quality acting through the Drinking Water Board to issue loans to political subdivisions to finance all or part of drinking water project costs and to enter into "credit enhancement agreements", "interest buy-down agreements", and "Hardship Grants" is provided in Title 73, Chapter 10c, Utah Code.

R309-700-3. Definitions and Eligibility.

Title 73, Chapter 10c, subsection 4(2)(a) limits eligibility for financial assistance under this section to political subdivisions.

Definitions for terms used in this rule are given in R309-110. Definitions for terms specific to this rule are given below.

"Board" means the Drinking Water Board.

"Drinking Water Project" means any work or facility that is necessary or desirable to provide water for human consumption and other domestic uses. Its scope includes collection, treatment, storage, and distribution facilities; and also includes studies, planning, education activities, and design work that will promote protecting the public from waterborne health risks.

"Project Costs" include the cost of acquiring and constructing any project including, without limitation: the cost of acquisition and construction of any facility or any modification, improvement, or extension of such facility; any cost incident to the acquisition of any necessary project, easement or right of way, engineering or architectural fees, legal fees, fiscal agents' and financial advisors' fees; any cost incurred for any preliminary planning to determine the economic and engineering feasibility of a proposed project; costs of economic investigations and studies, surveys, preparation of designs, plans, working drawings, specifications and the inspection and supervision of the construction of any facility; interest accruing on loans made under this program during acquisition and construction of the project; costs for studies, planning, education

activities, and design work that will promote protecting the public from waterborne health risks; and any other cost incurred by the Board or the Department of Environmental Quality, in connection with the issuance of obligation to evidence any loan made to it under the law.

"Disadvantaged Communities" are defined as those communities located in an area which has a median adjusted gross income less than or equal to 80% of the State's median adjusted gross income, as determined by the Utah State Tax commission from federal individual income tax returns excluding zero exemption returns, or where the estimated annual cost, including loan repayment costs, of drinking water service for the average residential user exceeds 1.75% of the median adjusted gross income. If, in the judgment of the Board, the State Tax Commission data is insufficient the Board may accept other measurements of the water users' income (i.e. local income survey or questionnaire when there is a significant difference between the number of service connections for a system and the number of tax filing for a given zip code or city).

"Drinking Water Project Obligation" means any bond, note or other obligation issued to finance all or part of the cost of acquiring, constructing, expanding, upgrading or improving a drinking water project, including, but not limited to, preliminary planning, studies, surveys, engineering or architectural fees, and preparation of plans and specifications.

"Credit Enhancement Agreement" means any agreement entered into between the Board, on behalf of the State, and an eligible water system for the purpose of providing methods and assistance to eligible water systems to improve the security for and marketability of drinking water project obligations.

"Eligible Water System" means any community drinking water system owned by a political subdivision of the State.

"Interest Buy-Down Agreement" means any agreement entered into between the Board, on behalf of the State, and an eligible water system, for the purpose of reducing the cost of financing incurred by an eligible water system on bonds issued by the subdivision for project costs.

"Financial Assistance" means a project loan, credit enhancement agreement, interest buy-down agreement, or technical assistance.

"Interest" means an assessment applied to loan recipients. The assessment shall be calculated as a percentage of principal.

"Emergency" means an unexpected, serious occurrence or situation requiring urgent or immediate action resulting from the failure of equipment or other infrastructure, or contamination of the water supply, threatening the health and / or safety of the public / water users.

R309-700-4. Application and Project Initiation Procedures.

The following procedures must normally be followed to obtain financial assistance from the Board:

(1) It is the responsibility of the applicant to obtain the necessary financial, legal and engineering counsel to prepare its application and an effective and appropriate financial assistance agreement.

(2) The applicant is required to submit a completed application form, an engineering report listing the project alternatives considered and including a justification for the chosen alternative, a project financing plan that includes an evaluation of credit enhancement, interest buy-down and loan methods applicable to the project, and documents necessary to perform a financial capability assessment (when requested), and capacity assessment (when determined to be beneficial for evaluating project feasibility). Comments from the local health department and/or district engineer may accompany the application. Comments from other interested parties such as an association of governments will also be accepted. Those costs incurred subsequent to the submission of a completed funding application form to the Board and prior to the execution of a financial assistance agreement and which meet the criteria for project costs are eligible for reimbursement from the proceeds of the financial assistance agreement.

(3) Division staff will evaluate the application and supporting documentation, calculate proposed terms of financial assistance, prepare a report for review by the Board, and present said report to the Board for its consideration.

(4) The Board may authorize financial assistance for the project on the basis of the staff's feasibility report and designate whether a loan, credit enhancement agreement, interest buy-down agreement, hardship grant or any combination thereof, is to be entered into, and approve the project schedule (see R309-700-13). The Board shall authorize a hardship grant only if it determines that other financing alternatives are unavailable or unreasonably expensive to the applicant (see R309-700-5). If the applicant seeks financial assistance in the form of a loan of amounts in the security account established pursuant to Chapter 10c, Title 73 Utah Code, which loan is intended to provide direct financing of projects costs, then the Board shall authorize such loan only if it determines that credit enhancement agreements, interest buy-down agreements and other financing alternatives are unavailable or unreasonably expensive to the applicant or that a loan represents the financing alternative most economically advantageous to the state and the applicant; provided, that for purposes of this paragraph and for purposes of Section 73-10c-4(2), Utah Code, the term "loan" shall not include loans issued in connection with interest buy-down agreements as described in R309-700-10(2) or in connection with any other interest buy-down arrangement.

(5) Planning Grant - The applicant must submit an application provided by the Division and attach a scope of work, project schedule, cost estimates, and a draft contract for planning services.

(6) Planning Loan - The applicant requesting a Planning Loan must complete an application for a Planning Loan, prepare a plan of study, satisfactorily demonstrate procurement of planning services, and prepare a draft contract for planning services including financial evaluations and a schedule of work.

(7) Design Grant or Loan - The applicant requesting a Design Grant or Loan must have completed an engineering plan meeting program requirements.

(8) The applicant must demonstrate public support for the project. As a minimum, for a loan to be secured by a revenue bond, the Sponsor must mail notices to each water user in the Sponsor's service area informing them of a public hearing. In addition to the time and location of the public hearing the notice shall inform water users of the Sponsor's intent to issue a non-voted revenue bond to the Board, shall describe the face amount of the bond, the rate of interest, the repayment schedule and shall describe the impact of the project on the user including: user rates, impact and connection fees. The notice shall state that water users may respond to the Sponsor in writing or in the public hearing within ten days after the date of the notice. A copy of all written responses and a certified record of a public hearing shall be forwarded to the Division of Drinking Water.

(9) For financial assistance mechanisms when the applicant's bond is purchased by the Board, the project applicant's bond documentation, including an opinion from legal counsel experienced in bond matters that the drinking water project obligation is a valid and binding obligation of the applicant (see R309-700-13(3)), must be submitted to the Assistant Attorney General for preliminary approval and the applicant shall publish a Notice of Intent to issue bonds in a newspaper of general circulation pursuant to the Utah Code, Section 11-14-21. For financial assistance mechanisms when the applicant's bond is not purchased by the Board, the applicant shall submit a true and correct copy of an opinion from legal counsel experienced in bond matters that the drinking water project obligation is a valid and binding obligation of the applicant.

(10) Hardship Grant - The Board or its designee executes a grant agreement setting forth the terms and conditions of the grant.

(11) As authorized in 19-4-106(3) of the Utah Code, the Executive Secretary may review plans, specifications, and other data pertinent to proposed or expanded water supply systems to insure proper design and construction, as specified in rule R309-500-4 General. Construction of a public drinking water project shall not begin until complete plans and specifications have been approved in writing by the Executive Secretary.

(12) If a project is designated to be financed by the Board through a loan or an interest buy-down agreement as described in R309-700-10(2) to cover any part of project costs an account supervised by the applicant and the Board will be established by the applicant to assure that loan funds are used only for qualified project costs. If financial assistance for the project is provided by the Board in the form of a credit enhancement or interest buy-down agreement as described in R309-700-10(1) all project funds will be maintained in a

separate account and a quarterly report of project expenditures will be provided to the Board.

(13) If a revenue bond is to be used to secure a loan, a User Charge Ordinance must be submitted to the Board for review and approval to insure adequate provisions for debt retirement and/or operation and maintenance. If a general obligation bond is to be used to secure a loan, a User Charge Ordinance must be submitted to the Board for review and approval to insure the system will have adequate resources to provide acceptable service.

(14) A plan of operation for the completed project, including staffing with an appropriately certified (in accordance with R309-300) operator, staff training, and procedures to assure efficient start-up, operation and maintenance of the project, must be submitted by the applicant and approved by the Board, its Executive Secretary or other designee.

(15) The applicant's contract with its engineer must be submitted to the Board for review to determine that there will be adequate engineering involvement, including project supervision and inspection, to successfully complete the project.

(16) The applicant's attorney must provide an opinion to the Board regarding legal incorporation of the applicant, valid legal title to rights-of-way and the project site, and adequacy of bidding and contract documents.

(17) CREDIT ENHANCEMENT AGREEMENT AND INTEREST BUY-DOWN AGREEMENT ONLY - The Board executes the credit enhancement agreement or interest buy-down agreement setting forth the terms and conditions of the security or other forms of assistance provided by the agreement and notifies the applicant to sell the bonds (See R309-700-9 and -10).

(18) CREDIT ENHANCEMENT AGREEMENT AND INTEREST BUY-DOWN AGREEMENT ONLY - The applicant sells the bonds and notifies the Board of the terms of sale. If a credit enhancement agreement is utilized, the bonds shall contain the legend required by Section 73-10c-6(3)(d), Utah Code. If an interest buy-down agreement is utilized, the bonds shall bear a legend which makes reference to the interest buy-down agreement and states that such agreement does not constitute a pledge of or charge against the general revenues, credit or taxing powers of the state and that the holder of any such bond may look only to the applicant and the funds and revenues pledged by the applicant for the payment of interest and principal on the bonds.

(19) The applicant opens bids for the project.

(20) LOAN ONLY - The Board approves purchase of the bonds and executes the loan contract (see R309-700-4(24)).

(21) LOAN ONLY - The loan closing is conducted.

(22) A preconstruction conference shall be held.

(23) The applicant issues a written notice to proceed to the contractor.

(24) The applicant must have adopted a Water Conservation Plan prior to executing the loan agreement.

R309-700-5. Loan, Credit Enhancement, Interest Buy-Down, and Hardship Grant Consideration Policy.

(1) Board Priority Determination. In determining the priority for financial assistance the Board shall consider:

(a) The ability of the applicant to obtain funds for the drinking water project from other sources or to finance such project from its own resources;

(b) The ability of the applicant to repay the loan or other project obligations;

(c) Whether a good faith effort to secure all or part of the services needed from the private sector through privatization has been made; and

(d) Whether the drinking water project:

(i) meets a critical local or state need;

(ii) is cost effective;

(iii) will protect against present or potential hazards;

(iv) is needed to comply with the minimum standards of the Federal Safe Drinking Water Act, 42 USC, 300f, et. seq. or similar or successor statute;

(v) is needed to comply with the minimum standards of the Utah Safe Drinking Water Act, Title 19, Chapter 4 or similar or successor statute.

(vi) is needed as a result of an Emergency.

(e) The overall financial impact of the proposed project on the citizens of the community, including direct and overlapping indebtedness, tax levies, user charges, impact or connection fees, special assessments, etc., resulting from the proposed project, and anticipated operation and maintenance costs versus the median income of the community;

(f) Consistency with other funding source commitments which may have been obtained for the project;

(g) The point total from an evaluation of the criteria listed in Table 1;

TABLE 1 **NEED FOR PROJECT**		
1. PUBLIC HEALTH AND WELFARE (SELECT ONE)		POINTS
	A. There is evidence that waterborne illnesses have occurred	15
	B. There are reports of illnesses which may be waterborne	10
	C. No reports of waterborne illness, but high potential for such exists	5
	D. No reports of possible waterborne illness and low potential for such exists	0
2. WATER QUALITY RECORD (SELECT ONE)		
	A. Primary Maximum Contaminant Level (MCL) violation more than 6 times in preceding 12 months	15
	B. In the past 12 months violated a primary MCL 4 to 6 times	12
	C. In the past 12 months violated a primary MCL 2 to 3 times or exceeded the Secondary Drinking Water Standards by double	9
	D. In the past 12 months violated MCL 1 time	6
	E. Violation of the Secondary Drinking Water Standards	5
	F. Does not meet all applicable MCL goals	3
	G. Meets all MCLs and MCL goals	0
3. VERIFICATION OF POTENTIAL SHORTCOMINGS (SELECT ONE)		
	A. Has had sanitary survey within the last year	5
	B. Has had sanitary survey within the last five years	3
	C. Has not had sanitary survey within last five years	0
4. GENERAL CONDITIONS OF EXISTING FACILITIES (SELECT ALL THOSE WHICH ARE TRUE AND PROJECT WILL REMEDY)		
	A. The necessary water treatment facilities do not exist, not functioning, functioning but do not meet the requirements of the Utah Public Drinking Water Rules (UPDWR)	10
	B. Sources are not developed or protected according to UPDWR	10
	C. Source capacity is not adequate to meet current demands and system occasionally goes dry or suffers from low pressures	10
	D. Significant areas within distribution system have inadequate fire protection	8
	E. Existing storage tanks leak excessively or are	5

	structurally flawed	
	F. Pipe leak repair rate is greater than 4 leaks per 100 connections per year	2
	G. Existing facilities are generally sound and meeting existing needs	0
5. ABILITY TO MEET FUTURE DEMANDS (Select One)		
	A. Facilities have inadequate capacity and cannot reliably meet current demands	10
	B. Facilities will become inadequate within the next three years	5
	C. Facilities will become inadequate within the next five to ten years	3
6. OVERALL URGENCY (Select One)		
	A. System is generally out of water. There is no fire protection or water for flushing toilets	10
	B. System delivers water which cannot be rendered safe by boiling	10
	C. System delivers water which can be rendered safe by boiling	8
	D. System is occasionally out of water	5
	E. Situation should be corrected, but is not urgent	0
TOTAL POSSIBLE POINTS FOR NEED FOR PROJECT		100

(h) Other criteria that the Board may deem appropriate.

(2) Drinking Water Board Financial Assistance Determination. The amount and type of financial assistance offered will be based on the following considerations:

(a) An evaluation based upon the criteria in Table 2 of the applicant's financial condition, the project's impact on the community, and the applicant's commitment to operating a responsible water system.

The interest rate to be charged by the Board for its financial assistance will be computed using the number of points assigned to the project from Table 2 to reduce, in a manner determined by Board resolution from time to time, the most recent Revenue Bond Buyer Index (RBBI) as published by the Bond Buyer's Guide. The interest rate so calculated will be assigned to the financial assistance. To encourage rapid repayment of a loan the Board will increase the interest rate 0.02 per cent (0.02%) for each year the repayment period exceeds five (5.0) years.

For hardship grant consideration, exclusive of planning and design grants or loans described in Sections R309-700-6, 7 and 8, the estimated annual cost of drinking water service for the average residential user should exceed 1.75% of the median adjusted gross household income from the most recent available State Tax Commission records or the local median adjusted gross income (MAGI) is less than or equal to eighty-percent (80.0%) of the State's median adjusted gross

income. When considering funding for planning and design grants and loans described in Sections R309-700-6, 7 and 8, the Board will consider whether or not the applicant's local MAGI meets the above criteria for hardship grant funding. If, in the judgment of the Board, the State Tax Commission data is insufficient, the Board may accept other measurements of the water users' income (i.e. local income survey or questionnaire when there is a significant difference between the number of service connections for a system and the number of tax filings for a given zip code or city). The Board will also consider the applicant's level of contribution to the project.

TABLE 2 **FINANCIAL CONSIDERATIONS**		
1. COST EFFECTIVENESS RATIO (SELECT ONE)		POINTS
	A. Project cost $0 to $500 per benefitting connection	16
	B. $501 to $1,500	14
	C. $1,501 to $2,000	11
	D. $2,001 to $3,000	8
	E. $3,001 to $5,000	4
	F. $5,001 to $10,000	1
	G. Over $10,000	0
2. CURRENT LOCAL MEDIAN ADJUSTED GROSS INCOME (AGI) (SELECT ONE)		
	A. Less than 70% of State Median AGI	19
	B. 71 to 80% of State Median AGI	16
	C. 81 to 95% of State Median AGI	13
	D. 96 to 110% of State Median AGI	9
	E. 111 to 130% of State Median AGI	6
	F. 131 to 150% of State Median AGI	3
	G. Greater than 150% of State Median AGI	0
3. APPLICANT'S COMMITMENT TO PROJECT PROJECT FUNDING CONTRIBUTED BY APPLICANT (SELECT ONE)		
	A. Greater than 25% of project funds	17
	B. 15 to 25% of project funds	14
	C. 10 to 15% of project funds	11
	D. 5 to 10% of project funds	8
	E. 2 to 5% of project funds	4
	F. Less than 2% of project funds	0
4 and 5. ABILITY TO REPAY LOAN		
4. WATER BILL (INCLUDING TAXES) AFTER PROJECT IS BUILT RELATIVE TO LOCAL MEDIAN ADJUSTED GROSS INCOME (SELECT ONE)		
	A. Greater than 2.50% of local median AG	16
	B. 2.01 to 2.50% of local median AGI	12

	C. 1.51 to 2.00% of local median AGI	8
	D. 1.01 to 1.50% of local median AGI	3
	E. 0 to 1.00% of local median AGI	0
5. SPECIAL INCENTIVES: Applicant (SELECT ALL THAT APPLY.)		
	A. Has a replacement fund receiving annual deposits of about 5% of the system's annual drinking water (DW) budget and fund has already accumulated a minimum of 10% of said annual DW budget in this reserve	5
	B. Has, in addition to item 5.A., accumulated an amount equal to at least 20% of its annual DW budget in its replacement fund	5
	C. Is creating or enhancing a regionalization plan	16
	D. Has a rate structure encouraging conservation	6
1TOTAL POSSIBLE POINTS FOR FINANCIAL NEED		100

(b) Optimizing return on the security account while still allowing the project to proceed.

(c) Local political and economic conditions.

(d) Cost effectiveness evaluation of financing alternatives.

(e) Availability of funds in the security account.

(f) Environmental need.

(g) Other criteria the Board may deem appropriate.

R309-700-6. Planning Grant.

(1) A Planning Grant can only be made to a political subdivision with a population less than 10,000 people demonstrating an urgent need to evaluate its drinking water system's technical, financial and managerial capacity, and lacks the financial means to readily accomplish such an evaluation.

(2) Qualifying for a Planning Grant will be based on the criteria listed in R309-700-5(2)(a).

(3) The applicant must demonstrate that all funds necessary to complete project planning will be available prior to commencing the planning effort. The Planning Grant will be deposited with these other funds into a supervised escrow account at the time the grant agreement between the applicant and the Board is executed or the Board may choose to

provide the funds in incremental disbursements as the applicant incurs expenses on the project.

(4) Failure on the part of the recipient of a Planning Grant to implement the findings of the plan may prejudice any future applications for drinking water project funding.

(5) The recipient of a Planning Grant must first receive written approval for any cost increases or changes to the scope of work.

(6) The Planning Grant recipient must provide a copy of the planning project results to the Division. The planning effort shall conform to rules R309.

R309-700-7. Planning Loan.

(1) A Planning Loan can only be made to a political subdivision which demonstrates a financial hardship preventing the completion of project planning.

(2) A Planning Loan is made to a political subdivision with the intent to provide interim financial assistance for project planning until the long-term project financing can be secured. The Planning Loan must be repaid to the Board unless the payment obligation is waived by the Board.

(3) The applicant must demonstrate that all funds necessary to complete project planning will be available prior to commencing the planning effort. The Planning Loan will be deposited with these other funds into a supervised escrow account at the time the loan agreement between the applicant and the Board is executed.

(4) The recipient of a Planning Loan must first receive written approval for any cost increases or changes to the scope of work.

(5) A copy of the document(s) prepared by means of the planning loan shall be submitted to the Division.

R309-700-8. Design Grant or Loan.

(1) A Design Grant or Loan can only be made to a political subdivision demonstrating financial hardship preventing completion of project design. For purposes of this Section R309-700-8, project design means engineering plans and specifications, construction contracts, and associated work.

(2) A Design Grant or Loan is made to a political subdivision with the intent to provide interim financial assistance for the completion of the project design until the long-term project financing can be secured. The Design Grant or Loan must be repaid to the Board unless the payment obligation is waived by the Board as authorized by 73-10c-4(3)(b).

(3) The applicant must demonstrate that all funds necessary to complete the project design will be available prior to commencing the design effort. The Design Grant or Loan will be deposited with these other funds into a supervised escrow account at the time the grant or loan agreement between the applicant and the Board is executed.

(4) The recipient of a Design Grant or Loan must first receive written approval from the Board before incurring any cost increases or changes to the scope of work.

R309-700-9. Credit Enhancement Agreements.

The Board will determine whether a project may receive all or part of a loan, credit enhancement agreement or interest buy-down agreement subject to the criteria in R309-700-5. To provide security for project obligations the Board may agree to purchase project obligations of applicants or make loans to the applicants to prevent defaults in payments on project obligations. The Board may also consider making loans to the applicants to pay the cost of obtaining letters of credit from various financial institutions, municipal bond insurance, or other forms of insurance or security for project obligations. In addition, the Board may consider other methods and assistance to applicants to properly enhance the marketability of or security for project obligations.

R309-700-10. Interest Buy-Down Agreements.

Interest buy-down agreements may consist of:

(1) A financing agreement between the Board and applicant whereby a specified sum is loaned or granted to the applicant to be placed in a trust account. The trust account shall be used exclusively to reduce the cost of financing for the project.

(2) A financing agreement between the Board and the applicant whereby the proceeds of bonds purchased by the Board is combined with proceeds from publicly issued bonds to finance the project. The rate of interest on bonds purchased by the Board may carry an interest rate lower than the interest rate on the publicly issued bonds, which when blended together will provide a reduced annual debt service for the project.

(3) Any other legal method of financing which reduces the annual payment amount on locally issued bonds. After credit enhancement agreements have been evaluated by the Board and it is determined that this method is not feasible or additional assistance is required, interest buy-down agreements and loans may be considered. Once the level of financial assistance required to make the project financially feasible is determined, a cost effective evaluation of interest buy-down options and loans must be completed. The financing alternative chosen should be the one most economically advantageous for the state and the applicant.

R309-700-11. Loans.

The Board may make loans to finance all or part of a drinking water project only after credit enhancement agreements and interest buy-down agreements have been evaluated and found either unavailable or unreasonably expensive. The financing alternative chosen should be the one most economically advantageous for the state and its political subdivisions.

R309-700-12. Project Authorization (Reference R309-700-4(4)).

A project may be "Authorized" for a loan, credit enhancement agreement, interest buy-down agreement, or hardship grant in writing by the Board following submission and favorable review of an application form, engineering report (if required), financial capability assessment, staff feasibility report, and capacity assessment (when determined to be beneficial for evaluating project feasibility). The engineering report shall include a cost effectiveness analysis of feasible project alternatives capable of meeting State and Federal drinking water requirements. It shall include consideration of monetary costs including the present worth or equivalent annual value of all capital costs, operation, maintenance, and replacement costs. The alternative selected must be the most economical means of meeting applicable State and Federal drinking water requirements over the useful life of the facility while recognizing environmental and other nonmonetary considerations. If it is anticipated that a project will be a candidate for financial assistance from the Board, the Staff should be contacted, and the plan of study for the engineering report (if required) should be approved before the planning is initiated.

Once the application form and other related documents have been reviewed and assessments made, the staff will prepare a project feasibility report for the Board's consideration in Authorizing a project. The project feasibility report will include a detailed evaluation of the project with regard to the Board's funding priority criteria, and will contain recommendations for the type of financial assistance which may be extended (i.e., for a loan, credit enhancement agreement, interest buy-down agreement, or hardship grant).

Project Authorization is not a contractual commitment and is conditioned upon the availability of funds at the time of loan closing or signing of the credit enhancement, interest buy-down, or grant agreement and upon adherence to the project schedule approved at that time. If the project is not proceeding according to the project schedule the Board may withdraw the project Authorization so that projects which are ready to proceed can obtain necessary funding. Extensions to the project schedule may be considered by the Board, but any extension requested must be fully justified.

R309-700-13. Financial Evaluations.

(1) The Board considers it a proper function to assist and give direction to project applicants in obtaining funding from such State, Federal or private financing sources as may be available to achieve the most effective utilization of resources in meeting the

needs of the State. This may also include joint financing arrangements with several funding agencies to complete a total project.

(2) Hardship Grants will be evidenced by a grant agreement.

(3) In providing any form of financial assistance in the form of a loan, the Board may purchase bonds of the applicant only if the bonds are accompanied by a legal opinion of recognized municipal bond counsel to the effect that the bonds are legal and binding under applicable Utah law (including, if applicable, the Utah Municipal Bond Act). For bonds of $150,000 or less the Board will not require this opinion.

(a) In providing any form of financial assistance in the form of a loan, the Board may purchase either a taxable or non-taxable bonds; provided that it shall be the general preference of the Board to purchase bonds issued by the applicant only if the bonds are tax exempt and are accompanied by a legal opinion of recognized municipal bond counsel to the effect that interest on the bonds is exempt from federal income taxation. Such an opinion must be obtained by the applicant in the following situations:

(i) Bonds which are issued to finance a project which will also be financed in part at any time by the proceeds of other bonds which are exempt from federal income taxation.

(ii) Bonds which are not subject to the arbitrage rebate provisions of Section 148 of the Internal Revenue Code of 1986 (or successor provision of similar intent), including, without limitation, bonds covered by the "small governmental units" exemption contained in Section 148(f)(4)(c) of the Internal Revenue Code of 1986 (or any successor provision of similar intent) and bonds which are not subject to arbitrage rebate because the gross proceeds from the loan will be completely expended within six months after the issuance of such bonds.

(b) In any other situations, the Board may purchase taxable bonds if it determines, after evaluating all relevant circumstances including the applicant's ability to pay, that the purchase of the taxable bonds is in the best interests of the State and applicant.

(c) If more than 25 percent of the project is to serve industry, bond counsel must evaluate the loan to ensure the tax exempt status of the loan fund.

(d) Revenue bonds purchased by the Board shall be secured by a pledge of water system revenues, and it is the general policy of the Board that the pledge of water revenues for the payment of debt service (principal and/or interest) on a particular revenue bond be on a parity with the pledge of those water revenues as security for the debt service payments on all other bonds or other forms of indebtedness which are secured by the water revenues.

(4) The Board will consider the financial feasibility and cost effectiveness of the project in detail. The financial capability assessment must be completed as a basis for the review. The Board may require that a full capacity assessment be made for a given project. The Board will generally use these reports and assessments to determine whether a project will be Authorized to receive a loan, credit enhancement agreement, interest buy-down agreement, or hardship grant (Reference R309-700-9, -10 and -11). If a project is Authorized to receive a loan, the Board will establish the portion of the construction cost to be included in the loan and will set the terms for the loan. The Board will require the applicants to repay the loan as rapidly as is reasonably consistent with the financial capability of the applicant. It is the Board's intent to avoid repayment schedules which would exceed the design life of the project facilities.

(5) Normal engineering and investigation costs incurred by the Department of Environmental Quality or Board during preliminary project investigation and prior to Board Authorization will not become a charge to the applicant if the project is found infeasible, denied by the Board, or if the applicant withdraws the Application prior to the Board's Authorization. If the credit enhancement agreement or interest buy-down agreement does not involve a loan of funds from the Board, then administrative costs will not be charged to the project. However, if the project is Authorized to receive a loan or grant of funds from the Board, all costs from the beginning of the project will be charged to the project and paid by the applicant as a part of the total project cost. If the applicant decides not to build the project after the Board has Authorized the project, all costs accruing after the Authorization will be reimbursed by the applicant to the Board.

(6) The Board shall determine the date on which the scheduled payments of principal and interest will be made. In fixing this date, all possible contingencies shall be considered, and the Board may allow the system one year of actual use of the project facilities before the first repayment of principal is required.

(7) The applicant shall furnish the Board with acceptable evidence that the applicant is capable of paying its share of the construction costs during the construction period.

(8) LOANS AND INTEREST BUY-DOWN AGREEMENTS ONLY - The Board may require, as part of the loan or interest buy-down agreement, that any local funds which are to be used in financing the project be committed to construction prior to or concurrent with the committal of State funds.

(9) The Board will not forgive the applicant of any payment after the payment is due.

(10) The Board will require a debt service reserve account be established by the applicant at or before the loan is closed. Deposits to that account shall be made at least annually in the amount of one-tenth of the annual payment on the bond(s) purchased by the Board and shall continue until the total amount in the debt service reserve fund is equal to the annual payment. The debt service reserve account shall be continued until the bond is retired. Annual reports/statements will be required. Failure to maintain the reserve

account will constitute a technical default on the bond(s) and may result in penalties being assessed. Annual reports/statements will be required.

(11) The Board will require a capital facilities replacement reserve account be established at or before the loan is closed. Deposits to that account shall be made at least annually in the amount of five percent (5%) of the applicant's annual drinking water system budget, including depreciation, unless otherwise specified by the Board at the time of loan authorization, until the loan is repaid. This fund shall not serve as security for the payment of principal or interest on the loan. The applicant shall adopt such resolutions as necessary to limit the use of the fund to construct capital facilities for its water system and to notify the Board prior to making any disbursements from the fund so the Board can confirm that any expenditure is for an acceptable purpose. The applicant will not need the consent of the Board prior to making any expenditure from the fund. Failure to maintain the reserve account will constitute a technical default on the bond(s) and may result in penalties being assessed. Annual reports/statements will be required.

(12) If the Board is to purchase a revenue bond, the Board will require that the applicant's water rates be established such that sufficient net revenue will be raised to provide at least 125% or such other amount as the Board may determine of the total annual debt service.

R309-700-14. Committal of Funds and Approval of Agreements.

After the Board has issued a Plan Approval and received the appropriate legal documents and other items required by Rule R309-700, the Board will determine whether the project loan, interest buy-down, credit enhancement, and/or grant meets the conditions of its authorization. If so, the Board will give its final approval. The Executive Secretary or designee may then execute the financial assistance agreement if no aspects of the project have changed significantly since the Board's authorization of the loan or credit enhancement, provided all conditions imposed by the Board have been met. If significant changes have occurred the Board will then review the project and, if satisfied, the Board will then commit funds, approve the signing of the contract, credit enhancement agreement, interest buy-down agreement, or grant agreement, and instruct the Executive Secretary to submit a copy of the signed contract or agreement to the Division of Finance.

R309-700-15. Construction.

The Division of Drinking Water staff may conduct inspections and will report to the applicant and applicant's engineer. Contract change orders must be properly negotiated with the contractor and approved in writing. Change orders in excess of $10,000 must receive prior written approval by the Executive Secretary before execution. The applicant shall notify the Executive Secretary when the project is near completion and request a final inspection. When the project is complete to the satisfaction of the applicant, the applicant's engineer, and the Executive Secretary, written

approval will be issued by the Executive Secretary in accordance with R309-500-9 to commence using the project facilities.

KEY: loans, interest buy-downs, credit enhancements, hardship grants
Date of Enactment or Last Substantive Amendment: July 1, 2011
Notice of Continuation: March 23, 2010
Authorizing, and Implemented or Interpreted Law: 19-4-104; 73-10c

R309-705. Financial Assistance: Federal Drinking Water Project Revolving Loan Program.

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R309-705. Financial Assistance: Federal Drinking Water State Revolving Fund (SRF) Loan Program.

R309-705-1. Purpose.

The purpose of this rule is to establish criteria for financial assistance to public drinking water system in accordance with a federal grant established under 42 U.S.C. 300j et seq., federal Safe Drinking Water Act (SDWA).

R309-705-2. Statutory Authority.

The authority for the Department of Environmental Quality acting through the Drinking Water Board to issue financial assistance for drinking water projects from a federal capitalization grant is provided in 42 U.S.C. 300j et seq., federal Safe Drinking Water Act, and Title 73, Chapter 10c, Utah Code.

R309-705-3. Definitions.

Definitions for general terms used in this rule are given in R309-110. Definitions for terms specific to this rule are given below.

"Board" means the Drinking Water Board.

"Drinking Water Project" means any work or facility that is necessary or desirable to provide water for human consumption and other domestic uses. Its scope includes collection, treatment, storage, and distribution facilities; and also includes studies, planning, education activities, and design work that will promote protecting the public from waterborne health risks.

"Project Costs" include the cost of acquiring and constructing any project including, without limitation: the cost of acquisition and construction of any facility or any modification, improvement, or extension of such facility; any cost incident to the acquisition of any necessary property, easement or right of way, except property condemnation cost, which are not eligible costs; engineering or architectural fees, legal fees, fiscal agents' and financial advisors' fees; any cost incurred for any preliminary planning to determine the economic and engineering feasibility of a proposed project; costs of economic investigations and studies, surveys, preparation of designs, plans, working drawings, specifications and the inspection and supervision of the construction of any facility; Hardship Grant Assessments, fees and interest accruing on loans made under this program during acquisition and construction of the project; costs for studies, planning, education activities, and design work that will promote protecting the public

from waterborne health risks; and any other cost incurred by the Board or the Department of Environmental Quality, in connection with the issuance of obligation to evidence any loan made to it under the law.

"Disadvantaged Communities" are defined as those communities located in an area which has a median adjusted gross income less than or equal to 80% of the State's median adjusted gross income, as determined by the Utah State Tax commission from federal individual income tax returns excluding zero exemption returns, or where the estimated annual cost, including loan repayment costs, of drinking water service for the average residential user exceeds 1.75% of the median adjusted gross income. If, in the judgment of the Board, the State Tax Commission data is insufficient the Board may accept other measurements of the water users' income (i.e. local income survey or questionnaire when there is a significant difference between the number of service connections for a system and the number of tax filing for a given zip code or city).

"Drinking Water Project Obligation" means any bond, note or other obligation issued to finance all or part of the cost of acquiring, constructing, expanding, upgrading or improving a drinking water project, including, but not limited to, preliminary planning, studies, surveys, engineering or architectural fees, and preparation of plans and specifications.

"Credit Enhancement Agreement" means any agreement entered into between the Board, on behalf of the State, and an eligible water system for the purpose of providing methods and assistance to eligible water systems to improve the security for and marketability of drinking water project obligations.

"Eligible Water System" means any community drinking water system, either privately or publicly owned; and nonprofit noncommunity water systems.

"Interest Buy-Down Agreement" means any agreement entered into between the Board, on behalf of the State, and an eligible water system, for the purpose of reducing the cost of financing incurred by an eligible water system on bonds issued by the subdivision for project costs.

"Financial Assistance" means a project loan, credit enhancement agreement, interest buy-down agreement, or technical assistance.

"Hardship Grant Assessment" means an assessment applied to a loan. The assessment shall be calculated as a percentage of outstanding principal balance of a loan, applied on an annual basis. Hardship grant assessment funds shall be subject to the requirements of UAC R309-700 for hardship grants.

"Negative Interest" means a loan with an interest rate at less than zero percent. The repayment schedule for loans having a negative interest rate will be prepared by the Drinking Water Board.

"Principal Forgiveness" means a loan wherein a portion of the loan amount is "forgiven" upon closing the loan. The terms for principal forgiveness will be as directed by section 4 of this rule and by the Drinking Water Board.

"Interest" means an assessment applied to a loan. The assessment shall be calculated as a percentage of outstanding principal balance of a loan, applied on an annual basis.

"Emergency" means an unexpected, serious occurrence of situation requiring urgent or immediate action. With regard to a water system this would be a situation resulting from the failure of equipment or other infrastructure, or contamination of the water supply, which threatens the health and / or safety of the public / water users.

"Technical Assistance" means financial assistance provided for a feasibility study or master plan, to identify and / or correct system deficiencies, to help a water system overcome other technical problems. The system receiving said technical assistance may or may not be required to repay the funds received. If repayment is required, the Board will establish the terms of repayment.

"SRF Technical Assistance Fund" means a fund (or account) that will be established for the express purpose of providing "Technical Assistance" to eligible drinking water systems.

R309-705-4. Financial Assistance Methods.

(1) Eligible Activities of the SRF.

Funds within the SRF may be used for loans and other authorized forms of financial assistance. Funds may be used for the construction of publicly or privately owned works or facilities, or any work that is an eligible project cost as defined by 73-10c-2 of the Utah Code or as allowed by 42 U.S.C.A. 300f et seq. Those costs incurred subsequent to the submission of a funding application to the Board and prior to the execution of a financial assistance agreement and which meet the above criteria are eligible for reimbursement from the proceeds of the financial assistance agreement.

(2) Types of Financial Assistance Available for Eligible Water Systems.

(a) Loans.

To qualify for "negative interest" or "principal forgiveness", the system must qualify as a "disadvantaged community" as defined in section 3 of this rule. Upon application, the Board will make a case by case determination whether the system is a "disadvantaged community". To be eligible to be considered as a

disadvantaged community, the system must meet the definition provided in section 3 of this rule. Additionally, the Board will consider the type of community served by the system, the economic condition of the community, the population characteristics of those served by the system, factors relating to costs, charges and operation of the water system, and other such information as the Board determines relevant to making the decision to recognize the system as a "disadvantaged community".

(i) Hardship Grant Assessment.

The assessment will be calculated based on the procedures and formulas shown in section 6 of this rule.

(ii) Repayment.

Annual repayments of principal, interest, fees and/or Hardship Grant Assessment generally commence not later than one year after project completion. Project completion shall be defined as the date the funded project is capable of operation and a notice of "beneficial occupancy" is given to the general contractor. Where a project has been phased or segmented, the repayment requirement applies to the completion of individual phases or segments.

The loan must be fully amortized not later than 20 years after project completion or not later than 30 years after project completion if the community served by the water system is determined to be a disadvantaged community. The yearly amount of the principal repayment is set at the discretion of the Board.

(iii) Principal Forgiveness.

Eligible water systems meeting the definition of "disadvantaged community" may qualify for financial assistance in the form of forgiveness of the principal loan amount. Terms for principal forgiveness will be determined by Board resolution.

Eligible applicants for "principal forgiveness" financial assistance will be considered by the Board on a case-by-case basis. The Board will consider the type of community served by the system, the economic condition of the community, the population characteristics of those served by the system, factors relating to costs, charges and operation of the water system, and such other information as the Board determines relevant to making the decision to recognize the system as a disadvantaged community.

(iv) Negative Interest Rate.

Eligible water systems meeting the definition of "disadvantaged community" may qualify for financial assistance in the form of a loan with a negative interest rate, as determined by Board resolution.

Eligible applicants for "negative interest" financial assistance will be considered by the Board on a case-by-case basis. The Board will consider the type of community served by the system, the economic condition of the community, the population characteristics of those served by the system, factors relating to costs, charges and operation of the water system, and such other information as the Board determines relevant to making the decision to recognize the system as a disadvantaged community.

(v) Dedicated Repayment Source and Security.

Loan recipients must establish one or more dedicated sources of revenue for repayment of the loan. As a condition of financial assistance, the applicant must demonstrate a revenue source and security, as required by the Board.

(b) Refinancing Existing Debt Obligations.

The Board may use funds from the SRF to buy or refinance municipal, inter-municipal or interstate agencies, where the initial debt was incurred and construction started after July 1, 1993. Refinanced projects must comply with the requirements imposed by the Safe Drinking Water Act(SDWA) as though they were projects receiving initial financing from the SRF.

(c) Credit Enhancement Agreements and Interest Buy-Down Agreements.

The Board will determine whether a project's funding may receive all or part of a loan, credit enhancement agreement or interest buy-down agreement. To provide security for project obligations, the Board may agree to purchase project obligations of applicants, or make loans to the applicants. The Board may also consider making loans to the applicants to pay the cost of obtaining letters of credit from various financial institutions, municipal bond insurance, or other forms of insurance or security for project obligations. The Board may also consider other methods of assistance to applicants to properly enhance the marketability of or security for project obligations.

Interest buy-down agreements may consist of any of the following:

(i) A financing agreement between the Board and applicant whereby a specified sum is loaned to the applicant. The loaned funds shall be placed

in a trust account, which shall be used exclusively to reduce the cost of financing for the project.

(ii) A financing agreement between the Board and the applicant whereby the proceeds of bonds purchased by the Board is combined with proceeds from publicly issued bonds to finance the project. The rate of interest on bonds purchased by the Board may carry an interest rate lower than the interest rate on the publicly issued bonds, which when blended together will provide a reduced annual debt service for the project.

(iii) Any other legal method of financing which reduces the annual payment amount on publicly issued bonds. The financing alternative chosen should be the one most economically advantageous for the State and the applicant.

(d) Technical Assistance.

The Board may establish a fund (or account) into which the proceeds of an annual fee on loans will be placed. These funds will be used to finance technical assistance for eligible water systems.

This fund will provide low interest loans for technical assistance and any other eligible purpose as defined by Section 1452 of the Safe Drinking Water Act (SDWA) Amendments of 1996 to water systems that are eligible for Federal SRF loans. Repayment of these loans may be waived in whole or in part (grant funds) by the Board whether or not the borrower is disadvantaged.

(i) The Board may establish a fee to be assessed against loans authorized under the Federal SRF Loan Program. The revenue generated by this fee will be placed in a new fund called the "SRF Technical Assistance Fund".

(ii) The amount will be assessed as a percentage of the Principal Balance of the loan on an annual basis, the same as the annual interest and hardship grant assessment are assessed. The borrower will pay the fee annually when paying the principal and interest or hardship grant assessments.

(iii) The Board may set / change the amount of the fee from time to time as they determine meets the needs of the program.

(iv) This fee will be part of the "effective rate" calculated for the loan using Table 2, R309-705-6. This fee may be charged in lieu of or in addition to the interest rate or hardship grant assessment, but in no case will the total of the technical assistance fee, the interest rate, and hardship grant assessment exceed the "effective rate".

(v) The proceeds of the fund will be used as defined above or as modified by the Board in compliance with Section 1452 of the federal SDWA Amendments of 1996.

(3) Ineligible Projects.

Projects which are ineligible for financial assistance include:

(a) Any project for a water system in significant non-compliance, as measured by a "not approved" (R309-400) rating, unless the project will resolve all outstanding issues causing the non-compliance.

(b) Any project where the Board determines that the applicant lacks the technical, managerial, or financial capability to achieve or maintain SDWA compliance, unless the Board determines that the financial assistance will allow or cause the system to maintain long-term capability to stay in compliance.

(c) Any project meant to finance the expansion of a drinking water system to supply or attract future population growth. Eligible projects, however, can be designed and funded at a level which will serve the population that a system expects to serve over the useful life of the facility.

(d) Projects which are specifically prohibited from eligibility by Federal guidelines. These include the following:

(i) Dams, or rehabilitation of dams;

(ii) Water rights, unless the water rights are owned by a system that is being purchased through consolidation as part of a capacity development strategy;

(iii) Reservoirs, except for finished water reservoirs and those reservoirs that are part of the treatment process and are located on the property where the treatment facility is located;

(iv) Laboratory fees for monitoring;

(v) Operation and maintenance costs;

(vi) Projects needed mainly for fire protection.

R309-705-5. Application and Project Initiation Procedures.

The following procedures must normally be followed to obtain financial assistance from the Board:

(1) It is the responsibility of the applicant to obtain the necessary financial, legal and engineering counsel to prepare its application and an effective and appropriate financial assistance agreement.

(2) A completed application form and project engineering report (facility plan) listing the project alternatives considered and including a justification for the chosen alternative, a project financing plan including an evaluation of credit enhancement, interest buy-down and loan methods applicable to the project and financial capability assessment and a history of the applicant's compliance with the SDWA are submitted to the Board. Comments from other interested parties such as an association of governments, the local health and planning departments, and the Department of Environmental Quality (DEQ) District Engineers will also be accepted. Those costs incurred subsequent to the submission of a completed funding application form to the Board and prior to the execution of a financial assistance agreement and which meet the criteria for project costs are eligible for reimbursement from the proceeds of the financial assistance agreement.

(3) An engineering and financial feasibility report and a capacity development analysis are prepared by Division staff for presentation to and consideration by the Board. A Capacity Assessment will be made by Division staff (See rule R309-352) for "equivalency" projects, essentially, those funded by the annual federal Capitalization Grant as defined by federal regulations. A capacity assessment may be prepared for a "non-equivalency project when it is determined to be beneficial for evaluating project feasibility.

(4) The Board may authorize financial assistance for the project on the basis of the staff's feasibility report and designate whether a loan, credit enhancement agreement, interest buy-down agreement, or any combination thereof, is to be entered into, and approve the project schedule (see section 7 of this rule).

(5) The applicant must demonstrate public support for the project prior to bonding, as deemed acceptable by the Drinking Water Board. As a minimum, for a loan to be secured by a revenue bond, the Sponsor must mail notices to each water user in the Sponsor's service area informing them of a public hearing. In addition to the time and location of the public hearing the notice shall inform water users of the Sponsor's intent to issue a non-voted revenue bond to the Board, shall describe the face amount of the bond, the "effective rate", the repayment schedule and shall describe the impact of the project on the user including: user rates, impact and connection fees. The notice shall state that water users may respond to the Sponsor in writing or in the public hearing within ten days after the date of the notice. A copy of all written responses and a certified record of the public hearing shall be forwarded to the Division of Drinking Water.

(6) For financial assistance mechanisms where the applicant's bond is purchased by the Board, the project applicant's bond documentation must include an opinion from

recognized bond counsel. Counsel must be experienced in bond matters, and must include an opinion that the drinking water project obligation is a valid and binding obligation of the applicant (see section 8 of this rule). The opinion must be submitted to the Assistant Attorney General for preliminary approval and the applicant shall publish a Notice of Intent to issue bonds in a newspaper of general circulation pursuant to 11-14-21 of the Utah Code. For financial assistance mechanisms when the applicant's bond is not purchased by the Board, the applicant shall submit a true and correct copy of an opinion from legal counsel, experienced in bond matters, that the drinking water project obligation is a valid and binding obligation of the applicant.

(7) As authorized in 19-4-106(3) of the Utah Code, the Executive Secretary may review plans, specifications, and other data pertinent to proposed or expanded water supply systems to insure proper design and construction, as specified in rule R309-500-4 General. Construction of a public drinking water project shall not begin until complete plans and specifications have been approved in writing by the Executive Secretary.

(8) If a project is designated to be financed by the Board through a loan or an interest buy-down agreement, an account supervised by the applicant and the Board will be established by the applicant to assure that loan funds are used only for eligible project costs. If financial assistance for the project is provided by the Board in the form of a credit enhancement or interest buy-down agreement, all project funds will be maintained in a separate account, and a quarterly report of project expenditures will be provided to the Board.

Incremental disbursement bonds will be required. Cash draws will be based on a schedule that coincides with the rate at which project related costs are expected to be incurred for the project.

(9) If a revenue bond is to be used to secure a loan, a User Charge Ordinance, or water rate structure, must be submitted to the Board for review and approval to insure adequate provisions for debt retirement and/or operation and maintenance. If a general obligation bond is to be used to secure a loan, a User Charge Ordinance must be submitted to the Board for review and approval to insure the system will have adequate resources to provide acceptable service.

(10) A "Private Company" will be required to enter into a Loan Agreement with the Board. The loan agreement will establish the procedures for disbursement of loan proceeds and will set forth the security interests to be granted to the Board by the Applicant to secure the Applicant's repayment obligations.

> (a) The Board may require any of the following forms of security interest or additional/other security interests to guarantee repayment of the loan: deed of trust interests in real property, security interests in equipment and water rights, and personal guarantees.

(b) The security requirements will be established after the Board's staff has reviewed and analyzed the Applicants financial condition.

(c) These requirements may vary from project to project at the discretion of the Board

(d) The Applicant will also be required to execute a Promissory Note in the face amount of the loan, payable to the order of the lender, and file a Utah Division of Corporations and Commercial Code Financing Statement, Form UCC-1.

(e) The Board may specify that loan proceeds be disbursed incrementally into an escrow account for expected construction costs, or it may authorize another acceptable disbursement procedure.

(11) The applicant's contract with its engineer must be submitted to the Board for review to determine if there will be adequate engineering involvement, including project supervision and inspection, to successfully complete the project.

(12) The applicant's attorney must provide an opinion to the Board regarding legal incorporation of the applicant, valid legal title to rights-of-way and the project site, validity and quantity of water rights, and adequacy of bidding and contract documents, as required.

(13) A position fidelity bond may be required by the Board insuring the treasurer or other local staff handling the repayment funds and revenues produced by the applicant's system and payable to the State of Utah through the Drinking Water Board.

(14) CREDIT ENHANCEMENT AGREEMENT AND INTEREST BUY-DOWN AGREEMENT ONLY - The Board shall execute the credit enhancement agreement or interest buy-down agreement setting forth the terms and conditions of the security or other forms of assistance provided by the agreement and shall notify the applicant to sell the bonds.

(15) CREDIT ENHANCEMENT AGREEMENT AND INTEREST BUY-DOWN AGREEMENT ONLY - The applicant shall sell the bonds and shall notify the Board of the terms of sale. If a credit enhancement agreement is utilized, the bonds shall contain the legend required by 73-10c-6(3)(d) of the Utah Code. If an interest buy-down agreement is being utilized, the bonds shall bear a legend referring to the interest buy-down agreement and state that such agreement does not constitute a pledge of or charge against the general revenues, credit or taxing powers of the state and that the holder of any such bond may look only to the applicant and the funds and revenues pledged by the applicant for the payment of interest and principal on the bonds.

(16) The applicant shall open bids for the project.

(17) LOAN ONLY - The Board shall give final approval to purchase the bonds and execute the loan contract.

(18) LOAN ONLY - The closing of the loan is conducted.

(19) A preconstruction conference shall be held.

(20) The applicant shall issue a written notice to proceed to the contractor.

R309-705-6. Applicant Priority System and Selection of Terms of Assistance.

(1) Priority Determination.

The Board may, at its option, modify a project's priority rating based on the following considerations:

(a) The project plans, specifications, contract, financing, etc., of a lesser-rated project are ready for execution.

(b) Available funding.

(c) Acute health risk.

(d) Capacity Development (financial, technical, or managerial issues needing resolution to avoid EPA intervention).

(e) An Emergency.

The Board will utilize Table 1 to prioritize loan applicants as may be modified by (a), (b), (c), or (d) above.

TABLE 1
Priority System

	Deficiency Description	Points Received
	Source Quality/Quantity	
Health Risk (select one)		
	A. There is evidence that waterborne illnesses have occurred.	25
	B. There are reports of illnesses which may be waterborne.	20
	C. High potential for waterborne illness exists.	15
	D. Moderate potential for waterborne illness	8

	E. No evidence of potential health risks	0
Compliance with SDWA (select all that apply)		
	A. Source has been determined to be under the influence of surface water.	25
	B. System is often out of water due to inadequate source capacity.	20
	-or-	
	System capacity does not meet the requirements of UPDWR.	10
	C. Source has a history of three or more confirmed microbiological violations within the last year.	10
	D. Sources are not developed or protected according to UPDWR.	10
	E. Source has confirmed MCL chemistry violations within the last year.	10
	Total	**100**
	Treatment	
	Deficiency Description	Points Available
Health Risk/Compliance with SDWA (select all that apply)		
	A. Treatment system cannot consistently meet log removal requirements, turbidity standards, or other enforceable drinking water quality standards.	25
	B. The required disinfection facilities are not installed, are inadequate, or fail to provide adequate water quality.	25
	C. Treatment system is subject to impending failure, or has failed.	25
	-or-	
	Treatment system equipment does not meet demands of UPDWR including the lead and/or copper action levels.	20
	-or-	
	System equipment is projected to become inadequate without upgrades.	5
	Total	**75**
	Storage	
	Deficiency Description	Points Available
Health Risk / Compliance with SDWA (select all that apply)		
	A. Storage system is subject to impending failure, or has failed.	25
	-or-	

	System is old, cannot be easily cleaned, or subject to contamination.	15
	B. Storage system is inadequate for existing demands.	20
	-or-	
	Storage system demand exceeds 90% of storage capacity.	10
	C. Applicable contact time requirements cannot be met without an upgrade.	15
	D. System suffers from low static pressures.	15
	Total	**75**
	Distribution	
	Deficiency Description	Points Available
Health Risk/Compliance with SDWA (select all that apply)		
	A. Distribution system equipment is deteriorated or inadequate for existing demands.	20
	- or-	
	Distribution system is inadequate to meet 5 year projected demands.	10
	B. Applicable disinfectant residual maintenance requirements are not met or high backflow contamination potential exists.	20
	C. Project will replace pipe containing unsafe materials (lead, asbestos, etc).	15
	D. Minimum dynamic pressure requirements are not met.	10
	E. System experiences a heavy leak rate in the distribution lines.	10
	Total	**75**
Emergencies		
	Upon the Board finding of an emergency as required by R309-705-9.	
	Total	**100**

(2) Financial Assistance Determination.

The amount and type of financial assistance offered will be based upon the criteria shown in Table 2. As determined by Board resolution, disadvantaged communities may also receive zero-percent loans, or other financial assistance as described herein.

Effective rate calculation methods will be determined by Board resolution from time to time, using the Revenue Bond Buyer Index (RBBI)as a basis point, the points assigned in Table 2, and a method to reduce the interest rate from a recent RBBI rate down to a

potential minimum of zero percent. To encourage rapid repayment of a loan the Board will increase the interest rate 0.02 per cent (0.02%) for each year the repayment period exceeds five (5.0) years.

TABLE 2		
INTEREST, HARDSHIP GRANT FEE AND OTHER FEES REDUCTION FACTORS		POINTS
1. COST EFFECTIVENESS RATIO (SELECT ONE)		
A.	Project cost $0 to $500 per benefitting connection	16
B.	$501 to $1,500	14
C.	$1,501 to $2,000	11
D.	$2,001 to $3,000	8
E.	$3,001 to $5,000	4
F.	$5,001 to $10,000	1
G.	Over $10,000	0
2. CURRENT LOCAL MEDIAN ADJUSTED GROSS INCOME (AGI) (SELECT ONE)		
A.	Less than 70% of State Median AGI	19
B.	71 to 80% of State Median AGI	16
C.	81 to 95% of State Median AGI	13
D.	96 to 110% of State Median AGI	9
E.	111 to 130% of State Median AGI	6
F.	131 to 150% of State Median AGI	3
G.	Greater than 150% of State Median AGI	0
3. APPLICANT'S COMMITMENT TO PROJECT PROJECT FUNDING CONTRIBUTED BY APPLICANT (SELECT ONE)		
A.	Greater than 25% of project funds	17
B.	15 to 25% of project funds	14
C.	10 to 15% of project funds	11
D.	5 to 10% of project funds	8
E.	2 to 5% of project funds	4
F.	Less than 2% of project funds	0
4 ABILITY TO REPAY LOAN:		
4. WATER BILL (INCLUDING TAXES) AFTER PROJECT IS BUILT RELATIVE TO LOCAL MEDIAN ADJUSTED GROSS INCOME (SELECT ONE)		
A.	Greater than 2.50% of local median AG	16
B.	2.01 to 2.50% of local median AGI	12
C.	1.51 to 2.00% of local median AGI	8
D.	1.01 to 1.50% of local median AGI	3
E.	0 to 1.00% of local median AGI	0
6. SPECIAL INCENTIVES Applicant (SELECT ALL THAT APPLY.)		
A.	Has a replacement fund receiving annual deposits of about 5% of the system's annual drinking water (DW) budget, and fund has already accumulated a minimum of 10% of	5

	said annual DW budget in this reserve fund.	
B.	Has, in addition to item 5.A., accumulated an amount equal to at least 20% of its annual DW budget in its replacement fund	5
C.	Is creating or enhancing a regionalization plan	16
D.	Has a rate structure encouraging conservation	6
	TOTAL POSSIBLE POINTS FOR FINANCIAL NEED	**100**

R309-705-7. Project Authorization.

A project may receive written authorization for financial or technical assistance from the Board following submission and favorable review of an application form, engineering report (if required), capacity development (including financial capability) assessment and staff feasibility report. The engineering report shall include a cost effective analysis of feasible project alternatives capable of meeting State and Federal drinking water requirements. It shall include consideration of monetary costs including the present worth or equivalent annual value of all capital costs, operation, maintenance, and replacement costs. The alternative selected must be the most economical means of meeting applicable State and Federal drinking water requirements over the useful life of the facility while recognizing environmental and other nonmonetary considerations.

Once the application submittals are reviewed, the staff will prepare a project feasibility report for the Board's consideration in Authorizing a project. The project feasibility report will include an evaluation of the project with regard to the Board's funding priority criteria, and will contain recommendations for the type of financial assistance which may be extended (i.e., for a loan, credit enhancement agreement, or interest buy-down agreement).

The Board may authorize financial assistance for any work or facility to provide water for human consumption and other domestic uses. Generally, work means planning, engineering design, or other eligible activities defined elsewhere in these rules.

Project Authorization is conditioned upon the availability of funds at the time of loan closing or signing of the credit enhancement, or interest buy-down and upon adherence to the project schedule approved at that time. The Board, at its own discretion, may require the Applicant to enter into a "Commitment Agreement" with the Board prior to execution of final loan documents or closing of the loan. This Commitment Agreement or Binding Commitment may specify date(s) by which the Applicant must complete the requirements set forth in the Project Authorization Letter. The Commitment Agreement shall state that if the Department of Environmental Quality acting through the Drinking Water Board is unable to make the Loan by the Loan Date, this Agreement shall terminate without any liability accruing to the Department or the Applicant hereunder. Also, if the project does not proceed according to the project schedule, the Board may withdraw project Authorization, so that projects which are ready to proceed can obtain necessary funding. Extensions to the project schedule may be considered by the Board, but any extension requested must be fully justified.

R309-705-8. Financial Evaluations.

(1) The Board considers it a proper function to assist project applicants in obtaining funding from such financing sources as may be available.

(2) In providing financial assistance in the form of a loan, the Board may purchase bonds of the applicant only if the bonds are accompanied by a legal opinion of recognized municipal bond counsel. Bond counsel must provide an opinion that the bonds are legal and binding under applicable Utah law (including, if applicable, the Utah Municipal Bond Act). For bonds of $150,000 or less the Board will not require this opinion.

(3) In providing financial assistance in the form of a loan, the Board may purchase either taxable or non-taxable bonds; or a secured promissory note provided that it shall be the general preference of the Board to purchase bonds issued by the applicant only if the bonds are tax exempt. Tax-exempt bonds must be accompanied by a legal opinion of recognized municipal bond counsel to the effect that the Interest and the Hardship Grant Assessment, or a fee (also interest) on the bonds is exempt from federal income taxation. Such an opinion must be obtained by the applicant in the following situations:

(a) Bonds which are issued to finance a project which will also be financed in part at any time by the proceeds of other bonds which are exempt from federal income taxation.

(b) Bonds which are not subject to the arbitrage rebate provisions of Section 148 of the Internal Revenue Code of 1986 (or successor provision of similar intent), including, without limitation, bonds covered by the "small governmental units" exemption contained in Section 148(f)(4)(c) of the Internal Revenue Code of 1986 (or any successor provision of similar intent) and bonds which are not subject to arbitrage rebate because the gross proceeds from the loan will be completely expended within six months after the issuance of such bonds.

(4) If more than 25 percent of the project is to serve industry, bond counsel must evaluate the loan to ensure the tax exempt status of the loan fund.

(5) Revenue bonds purchased by the Board shall be secured by a pledge of water system revenues, and it is the general policy of the Board that the pledge of water revenues for the payment of debt service (principal and/or Hardship Grant Assessment) on a particular revenue bond be on a parity with the pledge of those water revenues as security for the debt service payments on all other bonds or other forms of indebtedness which are secured by the water revenues.

(6) If a project is Authorized to receive a loan, the Board will establish the portion of the construction cost to be included in the loan and will set the terms for the loan. It is the Board's intent to avoid repayment schedules exceeding the design life of the project facilities.

(7) Normal engineering and investigation costs incurred by the Department of Environmental Quality (DEQ) or Board during preliminary project investigation and prior to Board Authorization will not become a charge to the applicant if the project is found infeasible, denied by the Board, or if the applicant withdraws the Application prior to the Board's Authorization.

If the credit enhancement agreement or interest buy-down agreement does not involve a loan of funds from the Board administrative costs will not be charged to the project. However, if the Board Authorizes a loan for the project, all costs incurred by the DEQ or Board on the project will be charged against the project and paid by the applicant as a part of the total project cost. Generally, this will include all DEQ and Board costs incurred from the beginning of the preliminary investigations through the end of construction and close-out of the project. If the applicant decides not to build the project after the Board has Authorized the project, all costs accrued after the Authorization date will be reimbursed by the applicant to the Board.

(8) The Board shall determine the date on which the scheduled payments of principal, Hardship Grant Assessment, and interest will be made. In fixing this date, all possible contingencies shall be considered, and the Board may allow the system up to one year of actual use of the project facilities before the first repayment of principal is required.

(9) The applicant shall furnish the Board with acceptable evidence that the applicant is capable of paying its share of the construction costs during the construction period.

(10) LOANS AND INTEREST BUY-DOWN AGREEMENTS ONLY - The Board may require, as part of the loan or interest buy-down agreement, that any local funds which are to be used in financing the project be committed to construction prior to or concurrent with the committal of State funds.

(11) The Board will not forgive the applicant of any payment after the payment is due.

(12) The Board will require that a debt service reserve account be established by the applicant at or before the time that the loan is closed. Deposits to that account shall be made at least annually in the amount of one-tenth of the annual payment on the bond(s) purchased by the Board and shall continue until the total amount in the debt service reserve fund is equal to the annual payment. The debt service reserve account shall be continued until the bond is retired. Failure to maintain the reserve account will constitute a technical default on the bond(s).

(13) The Board will require a capital facilities replacement reserve account be established at or before the loan is closed. Deposits to that account shall be made at least annually in the amount of five percent (5%) of the applicant's annual drinking water system budget, including depreciation, unless otherwise specified by the Board at the time of loan authorization, until the loan is repaid. This fund shall not serve as security for the payment of principal or Hardship Grant Assessment on the loan. The applicant shall adopt such resolutions as necessary to limit the use of the fund to construct capital

facilities for its water system. The applicant will not need the consent of the Board prior to making any expenditure from the fund. Failure to maintain the reserve account will constitute a technical default on the bond(s) and may result in penalties being assessed.

(14) If the Board is to purchase a revenue bond, the Board will require that the applicant's water rates be established such that sufficient net revenue will be raised to provide at least 125% or such other amount as the Board may determine of the total annual debt service.

(15) The applicant must have adopted a Water Management and Conservation Plan prior to executing the loan agreement.

R309-705-9. Emergency Assistance.

(1) Authority: Title 73, Chapter 10c of State Statute and the SDWA Amendment of 1996 give the Board authority to provide emergency assistance to drinking water systems.

(2) Eligibility: Generally, any situation occurring as defined in Section R309-705-3 would qualify for consideration for emergency funding. However, prior to authorizing funds for an emergency, the Board may consider one or more of the various factors listed below:

(i) Was the emergency preventable? Did the utility / water system have knowledge that this emergency could be expected? If not. Should it have been aware of the potential for this problem? Did its management take reasonable action to either prevent it or to be as prepared as reasonably possible to correct the problem when it occurred (prepared financially and technically for the event causing the problem)?

(ii) Has the utility / system established a capital improvement replacement reserve fund? Has the utility / system been charging reasonably high rates in order to establish a reserve fund to cover normal infrastructure replacement and emergencies?

(iii) Is the community a disadvantaged (hardship) community?

(iv) Is the potential for illness, injury, or other harm to the public or system operators sufficiently high that the value of providing financial assistance outweighs other factors that would preclude providing this assistance. (Even though the State does not have any legal obligation to provide financial assistance to help correct the problem.).

(3) Requirements for the Applicant: The applicant will be required to do the following as a condition of receiving financial assistance to cope with a drinking water emergency:

(i) To the extent feasible, the utility / system shall first use its own resources, e.g. capital improvement replacement fund, to correct the problem.

(ii) If the utility / system is not placing funds into a reserve fund on a regular basis and / or is charging relatively low water rates it shall be required to examine its current rate structure and policies for placing funds into a reserve account. The Board may require the utility / system to establish a reserve account and / or to revise its rate structure (increasing its rate) as a condition of the loan.

(iii) The Board may place other requirements on the utility / system.

(4) Financial Agreements, Bonding, etc: The State will work with the Applicant to help secure obligating documents. For example, the Board:

(i) Could waive the 30-day notice period, if legally possible.

(ii) Could accept a generic bond.

(iii) Could accept an unsecured loan or bond.

(5) Funding Alternatives: An Applicant may be authorized to receive a loan by any of the financial assistance methods specified in R309-705-4 for funding an emergency project. The Board may set and revise the methodology and factors to be considered when determining the terms of financial assistance it provides including assigning a priority it deems appropriate. The terms of the loan, including length of repayment period, interest or hardship grant assessment, and principal forgiveness (grant) or repayment waivers will be determined at the time the emergency funding is authorized.

(6) Funding Process - The Board must find that an emergency exists according to the criteria in R309-705-9(2). It is anticipated that under normal emergency conditions time restraints will not allow a request for emergency funding to be placed on the agenda of a regularly scheduled Board meeting or adoption and advertisement of a project priority list. Therefore, the following procedures will be followed in processing a loan application for emergency assistance:

(i) Division staff will evaluate each application for emergency funding according to the criteria listed in R309-705-9(2). Staff will solicit recommendations from the LHD and District Engineer about the proposed project to mitigate the emergency. Staff will submit a report of its findings to the Board Chairperson or designee.

(ii) The Board Chairperson or designee will arrange for a timely meeting of the Board to consider authorizing assistance for the emergency. This meeting may be conducted by telephone.

R309-705-10. Committal of Funds and Approval of Agreements.

After the Board has issued a Plan Approval, the loan, credit enhancement, interest buy-down, or hardship grant will be considered by the Board for final approval. The Board will determine whether the agreement is in proper order. The Executive Secretary, or designee, may then execute the loan or credit enhancement agreement if no aspects of the project have changed significantly since the Board's authorization of the loan or credit enhancement, provided all conditions imposed by the Board have been met. If significant changes have occurred the Board will then review the project and, if satisfied, the Board will then commit funds, approve the signing of the contract, credit enhancement agreement, or interest buy-down agreement, and instruct the Executive Secretary to submit a copy of the signed contract or agreement to the Division of Finance.

R309-705-11. Construction.

The Division of Drinking Water staff may conduct inspections and will report to the applicant and applicant's engineer. Contract change orders must be properly negotiated with the contractor and approved in writing. Change orders in excess of $10,000 must receive prior written approval by the Executive Secretary before execution. When the project is complete to the satisfaction of the applicant, the applicant's engineer, and the Executive Secretary, written approval will be issued by the Executive Secretary in accordance with R309-500-9 to commence using the project facilities.

R309-705-12. Compliance with Federal Requirements.

(1) Applicants must show the legal, institutional, managerial, and financial capability to construct, operate, and maintain the drinking water system(s) that the project will serve.

(2) Applicant(s) shall require its contractors to comply with federal provisions for disadvantaged business enterprises and exclusions for businesses under suspension and/or debarment. Any bidder not complying with these requirements shall be considered a non-responsive bidder.

(3) As required by Federal Code, applicants may be subject to the following federal requirements (all assessments shall consider the impacts of the project twenty (20) years into the future):

Archeological and Historic Preservation Act of 1974, Pub. L. 86-523, as amended

Clean Air Act, Pub. L. 84-159, as amended

Coastal Barrier Resources Act, Pub. L. 97-348

Coastal Zone Management Act, Pub. L. 92-583, as amended

Endangered Species Act, Pub. L. 92-583

Environmental Justice, Executive Order 12898

Floodplain Management, Executive Order 11988 as amended by Executive Order 12148

Protection of Wetlands, Executive Order 11990

Farmland Protection Policy Act, Pub. L. 97-98

Fish and Wildlife Coordination Act, Pub. L. 85-624

National Environmental Policy Act of 1969 (NEPA), Pub. L. 91-190

National Historic Preservation Act of 1966, PL 89-665, as amended

Safe Drinking Water Act, Pub. L. 93-523, as amended

Wild and Scenic Rivers Act, Pub. L. 90-542, as amended

Age Discrimination Act of 1975, Pub. L. 94-135

Title VI of the Civil Rights Act of 1964, Pub. L. 88-352

Section 13 of the Federal Water Pollution Control Act Amendments of 1972, Pub. L. 92-500 (the Clean Water Act)

Section 504 of the Rehabilitation Act of 1973, Pub. L. 93-112 (including Executive Orders 11914 and 11250)

The Drug-Free Workplace Act of 1988, Pub. L. 100-690 (applies only to the capitalization grant recipient)

Equal Employment Opportunity, Executive Order 11246

Women's and Minority Business Enterprise, Executive Orders 11625, 12138 and 12432

Section 129 of the Small Business Administration Reauthorization and Amendment Act of 1988, Pub. L. 100-590

Anti-Lobbying Provisions (40 CFR Part 30)

Demonstration Cities and Metropolitan Development Act of 1966, Pub. L. 89-754, as amended

Procurement Prohibitions under Section 306 of the Clean Water Act and Section 508 of the Clean Water Act, including Executive Order 11738, Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans

Uniform Relocation and Real Property Acquisition Policies Act, Pub. L. 91-646, as amended

Debarment and Suspension, Executive Order 12549

Accounting procedures, whereby applicants agree to maintain a separate project account in accordance with Generally Accepted Accounting Standards and Utah State Uniform Accounting requirements.

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R309-800. Capacity Development Program.

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R309-800. Capacity Development Program.

R309-800-1. Authority.

(1) Under authority granted in Utah Code Subsection 19-4-104(1)(a)(v), the Drinking Water Board adopts this rule implementing the capacity development program and governing the allotment of federal funds to public water systems to assist them to comply with the Federal 1996 Reauthorized Safe Drinking Water Act (SDWA).

R309-800-2. Purpose.

(1) The SDWA makes certain federal funds available to states, through the Drinking Water State Revolving Loan Program as defined in section 1452(k)(2)(C) to provide assistance to any public water system as part of a capacity development strategy developed and implemented in accordance with section 1420(c) to ensure all new public water systems will be able to comply with the SDWA, to enhance existing public water systems' capability to comply with the SDWA, and determine which public water systems applying for financial assistance are eligible to use the State Revolving Funds.

(2) The purpose of the Capacity Development Program is to enhance and ensure the technical, managerial, and financial capacity of water systems. The Program's goals are:

(a) to promote long-term compliance with drinking water regulations, and

(b) to promote the public health protection objectives of the SDWA.

(c) to promote compliance with the requirements of the State of Utah's Groundwater Rule, R309-215-16, in identifying and correcting significant deficiencies in technical, managerial, and/or financial capacity.

R309-800-3. Definitions.

(1) Definitions for terms used in this rule are given in R309-110, except as modified below.

(2) "Capacity Development" means the technical, managerial, and financial capabilities of the water system to plan for, achieve, and maintain compliance with applicable drinking water standards.

(3) "Drinking Water Region Planning" means a county wide water plan, administered locally by a coordinator, who facilitates the input of representatives of each public water system in the county with a selected consultant, to determine how each public water system

will either collectively or individually comply with source protection, operator certification, monitoring including consumer confidence reports, capacity development including technical, financial and managerial aspects, environmental issues, available funding and related studies.

(4) "Small Water System" means a water system with less than 3,300 people being served.

(5) "Public Water System" means a system providing water for human consumption and other domestic uses through pipes or other constructed conveyances, which has at least 15 service connections or serves an average of at least 25 individuals daily at least 60 days out of the year.

(6) "Non-Community Water System" (NCWS) means a public water system that is not a community water system. There are two types of NCWS's: transient and non-transient.

(7) Non-Transient Non-Community Water System (NTNCWS) means a public water system that regularly serves at least 25 of the same nonresident persons per day for more than six months per year. Examples of such systems are those serving the same individuals (industrial workers, school children, church members) by means of a separate system.

(8) "New Water System" means a system that will become a community water system or non-transient, non-community water system on or after October 1, 1999.

(9) "Required reserve" means funds set aside to meet requirements set forth in a loan covenant/bond indenture.

R309-800-4. General.

(1) Capacity development criteria are to be used as a guideline for all water systems. These criteria constitute a standard applied when reviewing new systems applications, reviewing applications for financial assistance and assessing capacity of water systems rated unapproved or in significant non-compliance with SDWA requirements or State drinking water rules by the State or the EPA.

(2) Water systems shall meet the following criteria:

(a) Technical Capacity Criteria:

(i) Finished water shall meet all drinking water standards as required by Utah State Rules;

(ii) Personnel shall operate the system in accordance with the operations and maintenance manual;

(iii) A valid water right shall be obtained;

(iv) Water system shall meet source, storage, and distribution requirements as per Utah State Rules;

(v) Water system shall not be rated unapproved or in significant noncompliance by the State or the EPA.

(b) Managerial Capacity Criteria:

(i) The system owner(s) shall be clearly identified to the Executive Secretary;

(ii) The system shall meet all of the operator certification requirements as per R309-300 and backflow technician certification requirements as per R309-305.

(iii) A system or method shall be in-place to effectively maintain all requisite records, distribution system histories/maps, and compliance information; and

(iv) An operating plan shall include names and certification level of the system operator(s), facility operation and maintenance manuals, routine maintenance procedures, water quality violations response procedures, water quality monitoring plan, training plan, and emergency response plan;

(v) The Executive Secretary of the Drinking Water Board shall be informed of management changes.

(c) Financial Capacity Criteria:

(i) Revenues shall be greater than expenses;

(ii) A financial statement compilation by a Certified Public Accountant, or an audit if otherwise required of the water system, shall be completed every three years;

(iii) The water system shall devise and implement a managerial budget and accounting process in accordance with generally accepted principals;

(iv) The operating ratio (operating revenue divided by operating expenses excluding depreciation and required reserves) shall be greater than 1.0;

(v) The coverage ratio (total revenues minus operating expenses excluding depreciation and required reserves divided by annual debt service) shall be greater than 1.0;

(vi) Customers shall be metered; and

(vii) An emergency/replacement reserve shall be created and funded.

(3) Public Water Systems that use ground water, except those that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment, but including consecutive systems receiving finished ground water shall be subject to the sanitary survey requirements of R309-100-7 and the significant deficiency requirements of R309-215-16(3) in order to be in compliance with the Capacity Development Program requirements.

R309-800-5. Requirements for New Community and New Non-transient, Non-community Water Systems.

(1) Feasibility Review, (See R309-100-6).

(2) Each proposed, new water system must demonstrate that it has adequate technical, managerial, and financial capacity before it may provide water for human consumption. Proposed water systems shall submit the following for Capacity Assessment Review:

(3) Project Notification form, available on the Internet at www.drinkingwater.utah.gov/blank_forms.htm.

(4) A business plan, which includes a facilities plan, management plan, and financial plan.

(a) Facilities plan. The facilities plan shall describe the scope of the water services to be provided and shall include the following:

(i) A description of the nature and extent of the area to be served, and provisions for extending the water supply system to include additional area. The description shall include population and land use projections and forecasts of water usage;

(ii) An assessment of current and expected drinking water compliance based on monitoring data from the proposed water source;

(iii) A description of the alternatives considered, including interconnections with other existing water systems, and the reasons for selecting the method of providing water service. This description shall include the technical, managerial, financial and operational reasons for the selected method, and

(iv) An engineering description of the facilities to be constructed, including the construction phases and future phases and future plans for expansion. This description shall include an estimate of the full cost of any required construction, operation, and maintenance;

(b) Management plan. The management plan shall describe what is needed to provide for effective management and operation of the system and shall include the following:

(i) Documentation that the applicant has the legal right and authority to take the measures necessary for the construction, operation, and maintenance of the system. The documentation shall include evidence of ownership if the applicant is the owner of the system or, if the applicant is not the owner, legally enforceable management contracts or agreements;

(ii) An operating plan that describes the tasks to be performed in managing and operating the system. The operating plan shall consist of administrative and management organization charts, plans for staffing the system with certified operators, and provisions for an operations and maintenance manual; and

(iii) Documentation of credentials of management and operations personnel, cooperative agreements or service contracts including demonstration of compliance with R309-300 water system operator certification rule; and

(c) Financial plan. The financial plan shall describe the system's expected revenues, cash flow, income and issuance and repayment of debt for meeting the costs of construction, and the costs of operation and maintenance for at least five years from the date the applicant expects to begin system operation.

(5) After the information submitted by the applicant is complete, the Division of Drinking Water shall conduct a Capacity Assessment Review. The applicant shall be notified in writing whether or not the new system has demonstrated adequate capacity. No new community or non-transient, non-community system will be approved if it lacks adequate capacity.

(6) Those systems constructed without approval shall be subject to: points as specified in R309-400, and/or administrative and/or civil penalties and fines.

R309-800-6. Minimum Capacity Required for Financial Assistance Under Provisions of R309-700 and R309-705.

(1) Applicants for financial assistance shall complete an application form, available on the Internet at www.drinkingwater.utah.gov/blank_forms.htm. The application shall include project information and water system financial information and will be used to determine eligibility, establish project priority ranking, and provide a basis for determining financial assistance parameters.

(2) (a) As described in (3) below, applicants for financial assistance from the Federal

Drinking Water State Revolving Loan Program are required to complete and submit Capacity Development worksheets to the Executive Secretary.

(b) As described in (4) below, the Executive Secretary may require an applicant for a loan from the State's Revolving Loan Program to complete and submit Capacity Development worksheets for review.

(3) Financial assistance under the provisions of R309-705, Financial Assistance: Federal Drinking Water State Revolving Fund Loan Program. Financial assistance shall not be available to a water system that lacks the technical, managerial, or financial capability to maintain SDWA compliance, or is in significant non-compliance with any provisions of R309-200 through 225 or 500 through 550, unless:

(a) The use of the financial assistance will ensure compliance with SDWA and Utah rules; or

(b) The owner of the system agrees to undertake feasible and appropriate changes in operation to ensure technical, managerial, and financial capacity to maintain long-term compliance with SDWA.

(4) Financial assistance under the provisions of R309-700 Financial Assistance: State Drinking Water State Revolving Fund Loan Program. A Capacity Development Assessment may be necessary before the Executive Secretary considers whether a project is eligible for financial assistance under the State's Revolving Loan Program. The decision will be based on available water system information obtained through sanitary surveys, site visits, monitoring and reporting data, or other valid means. If, after review of available information, the Executive Secretary determines that a Capacity Development Assessment is necessary, he will require that the applicant complete and submit the Capacity Development worksheets to the Division. Otherwise, a Capacity Development Assessment is not required.

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