The Texas Commission on Environmental Quality (commission or TCEQ) proposes to amend §§290.38, 290.39, and 290.41 - 290.47.

BACKGROUND AND SUMMARY OF THE FACTUAL BASIS FOR THE PROPOSED RULES

The commission's staff have developed a number of staff guidance documents related to the design and operation of public water systems. These guidance documents contain various rule interpretations and agency policies regarding issues that are not addressed in great detail in the rules. The commission is proposing to incorporate some of the more long-standing policies into Chapter 290, Subchapter D of its rules. For example, the commission is proposing amendments to §290.39 to incorporate current policies regarding the review and approval of planning materials for wells that are constructed on an emergency basis. In §290.41, the commission proposes to incorporate its policies related to the use of plastic well casing and cementing the annular space between the well casing and the well bore hole. The commission is also proposing amendments to §290.44 that will incorporate current policies that lessen the design requirements for small pressure tanks at noncommunity water systems supplied by wells.

Currently, the commission rules require public water systems to use chlorine as a disinfectant. However, the rules permit the executive director to issue an exception that allows the use of other disinfectants on a case-by-case basis. In the past few years, an increasing number of systems have sought and obtained exceptions to use chloramines as part of their strategy to reduce disinfection byproduct levels. As part of the exception approval process, the commission establishes additional monitoring requirements on systems that use chloramines. However, this "exception-based" approach for regulating the use of chloramines imposes additional administrative burdens on both the TCEQ staff

and the public water systems. In order to eliminate this administrative burden, the commission is proposing several amendments which will allow the use of either chlorine or chloramine as standard disinfectants and will incorporate the current review and approval procedures and policies related to chloramines into §§290.42, 290.46, and 290.47.

Another proposed amendment in §290.42 would allow the executive director to review and approve the minimum separation distance required between large filter-to-waste lines and the receptacle into which the waste line discharges.

The commission is also proposing an amendment to §290.43 related to the design of overflow pipes for potable water storage tanks. This amendment would allow water systems to cover the outlet of the overflow pipe with an elastomeric duckbill valve or other device in lieu of a gravity-weighted hinged flap valve.

Several amendments to §290.44 are being proposed to update the commission's design requirements for potable water distribution systems using plastic pipe. These proposed amendments would explicitly allow the use of high-density polyethylene (HDPE) pipe, incorporate the current review and approval practices of the commission's staff related to American Water Works Association (AWWA) polyvinyl chloride (PVC), and prevent premature failure by increasing the minimum wall thickness required for ASTM PVC water lines not designed by a licensed professional engineer.

The commission is also proposing several amendments and additions to its existing rules regarding backflow prevention by public water systems. The proposed amendments more precisely define the

installation and testing requirements for backflow prevention assemblies, more clearly distinguish between the cross-connection control that occurs at the customer meter from that which occurs within the customer's premises, and more explicitly state the minimum requirements for an acceptable internal cross-connection program that can be used in lieu of placing a backflow prevention device at the customer meter. These proposed amendments can be found in §§290.44, 290.46, and 290.47.

The commission also proposes to establish alternative capacity requirements, or ACRs, for water systems that wholesale treated water to other public water systems. The commission previously adopted similar provisions that allow systems that serve retail connections to meet system-specific production, storage, pressure maintenance, and distribution requirements that are based on actual historical customer demands rather than meeting the commission's analogous standard requirements. However, current rules do not address systems that wholesale treated water, and consequently, the commission proposes to amend §290.45 to allow treated water wholesalers to take advantage of the system-specific ACR approach.

This proposal also contains a proposed amendment to §290.46 which allows treatment plants to use alternative methods and procedures to verify the accuracy of their benchtop and continuous (on-line) disinfectant residual analyzers and requires the treatment plant to recalibrate the analyzer if necessary.

The commission is also proposing to revise a definition in §290.38, replace several general statements with references to specific regulatory requirements in §§290.44 and 290.46, and clean up some sentence structure problems and typographical errors throughout Subchapter D.

SECTION BY SECTION DISCUSSION

Subchapter D, Rules and Regulations for Public Water Systems

Section 290.38, Definitions

The commission proposes to amend the definition of "air gap" in §290.38(17) so that the descriptive phrase "vertical separation distance" is used throughout the definition. No change in regulatory intent is intended.

Section 290.39, General Provisions

The proposed amendment to §290.39(d)(2) incorporates the provisions of a long-standing staff guidance document into commission rules. The proposal contained in new subparagraph (A) states that any emergency well must be constructed in accordance with the commission's normal design and construction requirements. In new subparagraph (B), the commission proposes to waive the requirement for pre-construction engineering plans and specifications but requires the submission of "as-built" plans and specifications and well completion data prior to placing the well into operation. Furthermore, this proposed subparagraph also requires that the construction be completed within 30 days of the date that the commission approved construction of an emergency well.

Section 290.41, Water Sources

The commission proposes to amend §290.41 to incorporate requirements regarding the use of plastic well casing; to provide additional information regarding the methods used to complete a new well; to reduce the amount of water that is wasted when testing a new well; and to require that microbiological samples for new wells be submitted to a certified laboratory.

The commission proposes to amend subparagraph §290.41(c)(3)(B) and proposes new clauses (i) through (iv) of this subparagraph to incorporate long-standing provisions of a staff guidance regarding the use of plastic well casing. The proposed amendment to subparagraph (B) specifies that polyvinyl chloride (PVC) well casing is the only plastic material currently approved as well casing by the commission. Proposed clause (i) requires the use of PVC materials that are specifically designed for use as well casing and requires the engineer to comply with applicable industry standards when designing and installing PVC well casing. Proposed clause (ii) assures that PVC well casing will be manufactured at a facility that has been certified in accordance with ANSI/NSF requirements and has met the applicable quality requirements for PVC well casing. The proposed clauses (iii) and (iv) prohibit the use of PVC well casing in applications where the structural integrity of the casing material could be compromised by the presence of organic solvents.

The commission proposes to amend subparagraph §290.41(c)(3)(C) and proposes new clauses (i) through (v) of that subparagraph to explain and expand on the requirements of the existing regulation. Although the proposal contains a number of additional provisions, each of the changes is consistent with the content of the referenced AWWA standard. No change in the intent of the rule or current regulatory requirements is intended.

The proposed amendment to subparagraph §290.41(c)(3)(C) establishes a minimum annular space between well casing and the bore hole or an outer well casing, if one is installed. This minimum annular space is consistent with the requirements of the AWWA and established industry practices. The commission proposes to amend the requirements currently contained in the subparagraph and relocate them to new clauses (i) through (v) of the proposed rule. The proposed clauses (i), (ii), and (v) contain

requirements that are being relocated, without change, from subparagraph (C). The proposed clause (i) contains the current requirement for the annulus to be cemented under pressure with enough cement to completely fill and seal the annular space. The proposed clause (ii) contains the existing requirement to cement the annulus from the top of the shallowest formation being developed to the surface of the ground, and clause (v) contains the existing provision that allows the commission to require the submission of documentation attesting to the adequacy of the cementing process.

The requirement proposed in §290.41(c)(3)(C)(iii) is not explicitly prescribed in current regulations but incorporates the cement specifications contained in the AWWA standard referenced by current rules. The proposed clause also describes how bentonite plugs, if used, must be installed and is consistent with the historical review and approval practices of commission staff.

The proposed requirement contained in §290.41(c)(3)(C)(iv) is currently part of subparagraph (C). However, the proposal expands on the current rule by explicitly stating that two of the cementing methods described by the AWWA standard are not recognized as pressure cementing methods.

The commission proposes to amend and reorganize §290.41(c)(3)(G) to incorporate provisions of a staff guidance document that was developed to assure uniform review practices for pump test data on new wells. The proposed amendment to subparagraph (G) will address the existing general requirement to conduct a pump test on each new well but, if adopted, would require a minimum four-hour resting period between any prior pumping and the commencement of the official pump test and sampling process. The proposed clause (i) contains the 36-hour pump test requirement currently located in subparagraph (G) but incorporates additional provisions currently addressed only in staff guidance.

These additional provisions describe alternate pump test conditions that will allow the driller or engineer to evaluate well capacity without having to pump the well for 36 consecutive hours.

Many of the requirements contained in proposed §290.41(c)(3)(G)(ii) and (iii) would be taken directly from language currently contained in subparagraph (G). However, the proposed clause (ii) provides that microbiological analyses, like the chemical analyses, must be conducted by a certified laboratory. This proposed addition would make the microbiological analytical standards for new wells consistent with those that apply to treated drinking water.

Section 290.42, Water Treatment

The commission proposes to amend §290.42 to include provisions that will allow public water systems to use chloramines without needing to obtain an exception to existing rules and to reduce the separation distance that must be maintained in a filter-to-waste air gap.

The proposed amendment to paragraph §290.42(b)(4) would require groundwater systems using chloramines to be able to test the free ammonia levels in their water. A similar amendment to §290.42(c)(3) would impose an identical requirement for springs and similar sources that use chloramines. This requirement is currently imposed on any system obtaining an exception to use chloramines in its treatment process.

The commission proposes to amend subparagraph §290.42(d)(15)(C) by adopting new clause (iv) and renumbering the subsequent clauses. This amendment is similar to those proposed in paragraphs

§290.42(b)(4) and §290.42(c)(3) in that it would require surface water treatment plants that use chloramine to be able to test for excess free ammonia levels.

The proposed amendment to subparagraph §290.42(e)(1) would require systems that treat surface water or groundwater systems that are under the direct influence of surface water to achieve a free chlorine, chlorine dioxide, or ozone residual prior to the formation of chloramines. This proposal is consistent with the commission's current review and approval practices and guidance provided by the US Environmental Protection Agency in its *Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources*.

The proposed amendment to subparagraph §290.42(e)(3)(G) would allow the use of chloramines as a routine disinfectant in that the use of this disinfectant would no longer require the system to obtain an exception.

Section 290.43, Water Storage

The commission proposes to amend subparagraph §290.43(c) in order to provide that a slight depression in an otherwise sloped storage tank roof may be acceptable under certain conditions. Specifically, the commission proposes to allow temporary ponding, such as that caused by rainfall, as long as the pond does not exceed one-quarter inch in depth and the pond does not compromise the integrity of the tank roof or its external coating.

The proposed amendment to paragraph §290.43(c)(3) will allow public water systems to cover the discharge opening of storage tank overflow pipes with devices other than a hinged, gravity-weighted

flap valve as long as the discharge cover automatically closes tightly with a gap of no more than one-sixteenth inch when the tank is not overflowing. The commission also proposes to amend the paragraph so that it more clearly states that the discharge cover, rather than the entire overflow pipe, must be located so that it is readily accessible for inspection.

The commission proposes to amend paragraph §290.43(d)(1) and adopt new subparagraphs (A) through (C). This proposal will codify a long-standing staff policy of granting exceptions to the mandatory four-to-one safety factor requirement for small pressure tanks at noncommunity water systems that have well pumps but no high service pump stations. The commission recognizes that these water systems tend to operate at lower pressures and flow rates than systems that serve residential connections. Consequently, less stress is placed on the pressure tanks at these systems and a lower safety factor can be utilized. The proposed amendment to paragraph (1) would exempt the pressure tanks at noncommunity systems with wells from the four-to-one safety factor if the installation met the requirements of subparagraphs (A) though (C). Proposed subparagraph (A) would limit the exemption to tanks with a capacity of less than 1000 gallons. The commission proposes in subparagraph (B) to establish an alternate safety factor for the tank that is based on twice the maximum pressure that the well pump is capable of producing. In subparagraph (C), the commission proposes to limit the exemption to systems that do not have any high service pumps connected to the distribution system served by the pressure tank.

Section 290.44, Water Distribution

Several amendments and additions to §290.44(a) are being proposed to update the commission's design requirements for potable water distribution systems that are constructed using plastic pipe. The

proposed amendment to paragraph (a)(2) would address the materials and design requirements for plastic pipe that is installed prior to the effective date of the proposed rule and would explicitly allow existing installed pipe to remain in use.

The commission is proposing new paragraph (a)(3) to explicitly allow the use of HDPE pipe, address the nominal design practices of the engineering community, and incorporate the current review and approval practices of commission staff. The proposed paragraph would allow piping with either NSF-pw certification or a combination of NSF Standard 61 certification and UL Standard 1285 certification since either certification process provides 3rd party certification for both health effects and performance testing. The proposed paragraph (a)(3) would also require pipe to be designed incorporating site-specific conditions and would establish minimum design standards that are consistent with typical industry practices.

In new subparagraph (a)(3)(A), the commission proposes specific minimum AWWA dimension ratios for PVC piping. In newly proposed subparagraph (a)(3)(B), the commission would explicitly state that HDPE pipe is acceptable for use in potable water distribution systems and establish a specific minimum AWWA dimension ratio for this material. In new subparagraph (a)(3)(C), the commission proposes to establish a minimum ASTM standard dimension ratio (SDR) of 21 for PVC pipe meeting the requirements of ASTM 2241. This proposal would increase the minimum wall thickness for small diameter PVC pipe from an SDR of 26 to an SDR of 21 and would establish a nominal design basis that is consistent with the requirements proposed in subparagraphs (A) and (B). The commission proposes subparagraph (a)(3)(D) to allow the executive director to approve the use of other types of plastic pipe

not explicitly addressed in the rule and the use of thinner walled pipe if engineering calculations and assumptions supporting the choice of pipe are provided with the materials for plan review.

The commission requires that public water systems be protected from actual or potential hazards associated from cross-connections and recognizes that this protection can be achieved by installing an appropriate backflow prevention device at the customer meter or by having the customer implement an adequate internal cross-connection control program as defined in subparagraph §290.44(h)(1)(B). The commission proposes to amend subparagraph §290.44(h)(1)(B) by adding a new clause (i) and renumbering the subsequent clauses in the subparagraph. The proposed clause (i) would explicitly require an adequate internal cross-connection program to include appropriate backflow prevention assemblies at each cross-connection within a facility and to require that those devices conform with the selection criteria proposed in a new section, §290.47(j) (relating to the Assessment of Hazards and Selection of Assemblies for Installation at Internal Cross-Connection Hazards). Although this requirement can be inferred from existing regulatory language, the commission is proposing clause (i) to make it an express requirement. The commission is also proposing to improve the distinction between a cross-connection control program implemented at the meter and an internal cross-connection program implemented at the cross-connection by amending §290.47(i) and creating a new §290.47(j); these two proposals will be discussed in greater detail subsequently in the preamble.

The commission is proposing amendments to §290.44(h)(4) to establish uniform installation requirements for backflow prevention assemblies. If a backflow prevention assembly is not installed correctly, it will not provide the required protection. Consequently, the commission proposes to require all backflow prevention devices that are installed to protect a public water system from health and non-

health hazards to be installed in accordance with the standards specified in the proposed rule. Currently, through the inspection report requirements contained in §290.47(f), the commission requires devices to be installed in accordance with manufacturer's recommendations and local codes. The adoption of two industry-recognized, widely-available cross-connection control documents and installation standards will facilitate training and continuing education efforts by reducing the need to provide training on a variety of disparate code requirements and language. In addition, some manufacturers and local codes indicate that their reduced pressure principle backflow assembly (RPBA) can be installed in a vertical position, even though the assembly has not been approved for vertical installation. Like the existing rule, the proposed revision would apply to those devices installed at the meter and those installed as part of an adequate internal cross-connection control program.

The proposed amendment to subparagraph §290.44(h)(4)(A) would replace a general statement regarding backflow prevention assembly tester licensing requirements with a reference to a specific rule. Similarly, the proposed amendment to §290.44(h)(4)(A)(ii) would refer testers to the state agency that establishes the testing requirements for backflow prevention assemblies on firelines rather than attempting to summarize the requirements of that state agency in the commission's rules.

§290.45 Minimum Water System Capacity Requirements

The commission proposes to amend §290.45(c)(1)(B)(ii) to correct an erroneous reference to the units of measurement. Specifically, the commission proposes to replace the term "gpm" with the phrase "gallons per unit" since volume is measured in gallons not gallons per minute.

The commission proposes to amend §290.45(d)(2)(B) to improve sentence structure. Specifically, the commission proposes to add two commas to the sentence to more clearly indicate that the requirement applies to systems that serve more than 300 people as well as to the systems that serve fewer than 300 people but use ground storage tanks. No change in regulatory requirements is intended.

The commission proposes to adopt a new subparagraph §290.45(g)(2)(D) to establish alternative capacity requirements, or ACRs, for water systems that wholesale treated water to other public water systems. In clause (D)(i) of this subparagraph, the commission proposes to establish an "equivalency ratio" for a treated water wholesaler. Using the proposed methodology, the equivalency ratio would be obtained though a three part calculation. First, the commission proposes to multiply the wholesaler's actual maximum daily demand (MDD) for all its customers by one of the safety factors proposed in subclauses (I) and (II) to obtain an adjusted MDD. The second part of the calculation would be to multiply the number of retail connections served by the wholesaler by 0.6 gallons per minute (gpm) and then add all of the wholesaler's contractual obligations; this calculation would yield a cumulative commitment. Finally, the equivalency ratio would be obtained by dividing the adjusted MDD by the cumulative commitment to yield the equivalency ratio. The equivalency ratio would represent the fraction of the total commitment that the wholesaler is expected to actually produce to meet customer demand in the immediate future. The equivalency ratio would then be used to determine the system-specific capacity requirements for the wholesaler.

Clause (D)(ii) contains the commission's proposal for the wholesaler's alternative minimum production capacity requirement. The commission proposes to calculate the alternative production capacity

requirement by multiplying the wholesaler's equivalency ratio by the sum of: the combined contractual commitments plus 0.6 gpm times the number of retail connections directly served by the wholesaler.

In clause (D)(iii), the commission proposes to require water wholesalers to provide sufficient raw water pump capacity to meet its alternative production capacity requirement with the largest pump out of service. This provision would also impose this requirement on the transfer pumps needed to move water from place to place within the treatment plant.

The commission's proposal would also establish an alternative clearwell capacity requirement for wholesalers that treat surface water or groundwater under the direct influence of surface water. This proposal is contained in clause (D)(iv) and its three subclauses. Specifically, the commission proposes to require wholesalers to provide enough clearwell capacity to meet or exceed all of the following criteria: the clearwell capacity must be at least five percent of the alternative production capacity requirement, the clearwell capacity must be sufficient for the wholesaler to meet minimum inactivation requirements for *Giardia lamblia* and viruses, and the clearwell capacity must be great enough to allow proper transfer pump and service pump operation during the hours of peak customer consumption.

The commission's proposed alternative treated water transfer pump capacity requirements for wholesalers are contained in clause (D)(v) and its three subclauses. The three subclauses describe how the commission proposes to calculate the alternate transfer pump capacity requirements for different types of designs. Subclause (I) describes how the commission proposes to calculate the alternative transfer pump capacity requirements for wholesale connections when the water is delivered to a purchaser's ground storage tank. In subclause (II), the commission proposes a method for calculating

alternative transfer pump capacity requirements for wholesale connections when the water is delivered to a purchaser's distribution system under direct pressure and the contract specifies the maximum hourly draft rate. In subclause (III), the commission proposes a method for calculating alternative transfer pump capacity requirements for wholesale connections when the water is delivered to a purchaser's distribution system under direct pressure and the contract specifies the maximum daily draft rate but not the maximum hourly draft rate. The alternative transfer pump capacity requirements for treated water wholesalers that the commission proposes in clause (D)(v) would be the sum of the values calculated using the methods described in the three subclauses. Furthermore, the commission's proposal would require the wholesaler to be able to meet its cumulative alternative transfer pump capacity requirement with the largest transfer pump out of service. If the wholesaler serves customers through different transfer pump stations, the commission intends to apply the "with the largest pump out of service" criteria to each pump station that cannot be supplemented with service from another pump station.

As indicated in proposed clause (D)(vi), the commission will calculate the capacity requirements for the wholesaler's retail connections by multiplying the equivalency ratio by the applicable capacity requirements for systems that do not have an ACR. As the clause indicates, the commission proposes that these calculations would be based on the retail connections in each pressure plane and would be in addition to any ACR established by subclause (v).

Section 290.46, Minimum Acceptable Operating Practices

The commission proposes to amend §290.46(d) and adopt new §290.46(d)(3) as part of its effort to establish chloramines as a standard alternative disinfectant to chlorine. The amendment to §290.46(d)

is proposed because, although ammonia-based compounds are used to form chloramines, normal disinfectant residual testing will not detect an ammonia overfeed. Consequently, the commission proposes to amend this subsection to address more than just disinfectant residuals.

The commission proposes paragraph (d)(3) to require systems using chloramines to monitor the free ammonia level of the water. Applying inappropriate amounts of ammonia can produce offensive tastes and odors. In addition, excessive ammonia levels for prolonged periods of time can result in the growth of nitrifying bacteria in the distribution system. Although these bacteria have no direct adverse health effect, elevated numbers have an indirect impact on potability by lowering the chloramine residual and by converting free ammonia to nitrate and nitrite. Since monitoring for the various species of nitrifying bacteria is an expensive, time-consuming process, the commission proposes to require plants to monitor the free ammonia levels within the treatment process, at the point where the treated water enters the distribution system, and at selected sites within the distribution system. The proposed subparagraph (A) would require plants to monitor the ammoniation process by measuring the free ammonia level in the water being treated each time that the chlorine or ammonia feed rates are adjusted. In proposed subparagraph (B), the commission would require the system to monitor the free ammonia levels entering the distribution system at least once every seven days. The requirement proposed in subparagraph (C) would compel systems to simultaneously monitor both chloramine and free ammonia levels at one or more designated sampling sites in the distribution system each month. The proposed monitoring regimen is consistent with the approval criteria that the commission currently uses when issuing exceptions to use chloramines.

The amendment that the commission is proposing to §290.46(j)(1) would replace a general statement regarding licensing and endorsement requirements for customer service inspectors with a reference to a specific rule.

The commission is proposing several amendments and additions to §290.46(q) as part of the effort to incorporate current review and approval practices and policies regarding chloramine use into Chapter 290. The commission is proposing to amend §290.46(q) by inserting a general statement regarding public notices and health advisories and relocating the existing requirement into new paragraph (1). The existing requirement primarily addresses abnormal operating conditions, and the commission proposes the amendment to avoid any potential misconception that the use of chloramines represents such a condition.

The other proposed amendments to §290.46(q) include: renumbering existing paragraph (1) as subparagraph (A); relocating the requirement for bilingual notices currently contained in paragraph (1) to new paragraph (4); renumbering existing paragraphs (1) – (3) as subparagraphs (A) – (C); proposing new paragraphs (2) and (3); and renumbering current paragraph (4) as new paragraph (5).

The commission proposes to relocate the sentence pertaining to bilingual notices currently contained in paragraph (1) to new paragraph (4) because this provision should apply to all notices and health advisories issued by the public water system. At its current location, the provision related to bilingual notices would explicitly apply only to the notices issued pursuant to the requirements of paragraph (1). The commission proposes to renumber existing paragraphs (1) through (3) as subparagraphs (A) through (C) because these provisions only apply to the notices addressed in new paragraph (1).

The commission proposes new paragraph (2) to ensure that public water systems are aware that they must also comply with the public notice requirements contained in §290.122 in Subchapter F of this title. The public notification requirements addressed in §290.122 are associated with violations related to various monitoring and reporting requirements and water quality and treatment violations that are not explicitly addressed in §290.46(q).

The commission proposes to incorporate existing staff policies and practices related to the approval and use of chloramines in new paragraph §290.46(q)(3) and its associated subparagraphs. In subparagraph (A), the commission proposes to require public water systems to notify their customers in writing at least fourteen days before they begin distributing chloraminated water for the first time. Furthermore, the commission proposes to require systems to submit documentation so that agency staff can determine whether this notice has been issued appropriately. This notice and the information in the proposed §§290.47(k) and (l) are currently required by commission staff as a condition to approval of an exception to use chloramines under the existing rule.

Many public water systems that use chloramines revert back to a free chlorine residual for a few days once or twice per year to control the presence of nitrifying bacteria and other nonpathogenic bacteria in the distribution system. Although this practice is often beneficial, it can impact the operation practices of systems that are purchasing treated water from a wholesaler that has temporarily reverted back to free chlorine. Consequently, the commission has been requested to adopt a new requirement that will ensure that public water systems that are purchasing treated water are notified each time that its wholesale supplier reverts back to free chlorine. In response to this suggestion, the commission has proposed subparagraph §290.46(q)(3)(B), which would require a system that distributes chloraminated

water to other public water systems to notify those systems and the commission of the proposed change in operating practices. The proposal would require the notice to be issued in writing at least fourteen days before the conversion to free chlorine will begin and contain both the beginning and ending date of the change.

Converting back to free chlorine on a periodic basis can result in temporary spikes in disinfection byproduct levels that are not representative of normal operating conditions. Since the commission has a contractor that periodically collects disinfection byproduct samples from each public water system, the commission has been recommending that a system notify the agency staff before reverting back to free chlorine in order to reduce the possibility that samples are collected at inappropriate times. Some public water systems have recommended that the commission propose a rule that makes this notice mandatory since replacing an inappropriately-timed sample increases the cost for both the commission and the public water system. In response to this suggestion, the commission has proposed subparagraph §290.46(q)(3)(C) requiring systems that distribute chloraminated water to retail customers to notify the commission of the proposed change in operating practices. The proposal would require the notice to be issued in writing at least fourteen days before the conversion to free chlorine will begin and contain both the beginning and ending date of the change.

As discussed previously, the commission proposes to relocate the existing provision related to bilingual notices from paragraph (1), where it is currently located, to new paragraph (4) and to renumber existing paragraph (4) as paragraph (5). These changes will ensure that bilingual notices are issued when appropriate.

Several public water systems have requested that the commission amend §290.46(s)(2)(C) to allow alternate calibration methods for benchtop and on-line disinfectant residual analyzers. These requests have been made because some instruments are not designed in a manner that facilitates calibration with a chlorine solution of known concentration and, in other cases, the instrument manufacturer recommends other methods for verifying the accuracy of its instrument. In response to these requests, the commission proposes to amend both clauses (i) and (ii) to allow public water systems to follow instructions provided by the equipment manufacturer when calibrating disinfectant residual analyzers and verifying accuracy. If the instrument owner's manual does not contain alternate calibration procedures, the proposed amendment would continue to require calibration with chlorine solutions of known concentration.

§290.47(f) Appendix F. Sample Backflow Prevention Assembly Test and Maintenance Report

The commission proposes several amendments to the Sample Backflow Prevention Assembly Test and Maintenance Report contained in §290.47(f). The commission proposes to amend the form so that it contains specific footnote references to the two notes currently located at the bottom of the form. The proposed amendments will explicitly state that the water system must retain the original copy of the inspection report and repairs must be completed using replacement parts from the assembly manufacturer. The commission also proposes to amend the form so that it contains a description of the hazard that the assembly is being installed to isolate, indicates whether the device is installed at the site of the hazard or at the customer meter, and identifies the reason that the test is being conducted. These proposed amendments will assist public water systems and commission staff when assessing the adequacy of an internal backflow prevention program.

The commission proposes to replace the reference to manufacturer's recommendations and local plumbing codes with a reference to 30 TAC §290.44(h)(4) for the reasons described previously. The commission also proposes to revise the form so that the device tester reports the date that the accuracy of the test equipment was verified rather than the date it was calibrated. Since a calibration validation is generally less costly than a complete recalibration, the proposed amendment should reduce the cost of verifying the continued accuracy of the test equipment.

§290.47(i) Appendix I: Assessment of Hazards and Selection of Assemblies for Premises Isolation.

The commission is proposing to amend §290.47(i) to improve the distinction between the requirements for devices installed at the customer meter and those that are installed as part of an adequate internal cross-connection control program. To achieve this improvement, the commission is proposing to amend the introduction to §290.47(i) so that it explicitly states that this section applies to the types of assemblies that are to be installed at the customer meter when the customer does not have an adequate internal cross-connection control program. The commission also proposes to replace the term "commercial laundries" with the term "dry cleaning facilities" in order to more precisely describe the type of premises in question. The commission also proposes to relocate all references to the devices installed as part of an internal program to newly proposed subsection §290.47(j) and to amend the note below the table so that it only defines the types of devices addressed in the table.

§290.47(j) Appendix J: Assessment of Hazards and Selection of Assemblies for Installation at Internal Cross-Connection Hazards

As discussed previously, the commission is proposing a new subsection, §290.47(j), to improve the distinction between the requirements for devices installed at the customer meter and those that are

installed as part of an adequate internal cross-connection control program. To achieve this goal, the commission is proposing several amendments to the table related to internal cross-connection hazards and protection assemblies and to relocate it from §290.47(i) to the new subsection (j). The proposed amendments to the table include: removing the reference to "domestic space-heating boiler;" replacing the term "heating equipment" with the term "boilers with chemical additives" and eliminating the references to "commercial" and "residential" heaters; replacing the term "vending machines" with the term "post-mix carbonated beverage dispensing machines" and eliminating the option of installing a pressure vacuum breaker to isolate these machines from the potable supply; and eliminating the option of isolating a watering trough using a pressure vacuum breaker. The commission is also proposing a footnote for the term "connection to sewer" so that the provision would not apply to residential dishwashers installed in compliance with the International Residential Code or a plumbing code adopted by the Texas State Board of Plumbing Examiners.

In addition to the amendments to the table, the commission is proposing a new introduction to subsection (j) that will describe the general use and content of the subsection and a note below the table that will define all of the abbreviations used in the subsection.

§290.47(k) Appendix K. Sample Public Notice for Chloramine Users

The newly proposed §290.47(k) includes a suggested format for the public notice that public water systems must issue before beginning to use chloramines for the first time. Alternate formats may be used but the notice must contain all of the essential elements contained in the proposed appendix. These elements include: the date that the public water system will convert from free chlorine to chloramine, the name of the public water system and the name and telephone number of the individual at the system

that can answer customer questions, the reason that the system is converting to chloramines, a description of the susceptible population, and the nature of the risks and actions that can be taken to mitigate them.

§290.47(l) Appendix L. Certificate of Delivery of Public Notice to Customers for Change from Free Chlorine to Chloramines

The newly proposed §290.47(l) contains the form that the commission proposes to require systems to complete and submit when they issue the initial public notice regarding the use of chloramine. The form describes the manner in which the notice must be issued and the methods that the water system used to notify the public that would not be reached by mail or direct delivery. The commission proposes to require systems to submit this specific form and does not propose to allow systems to submit the information in another format.

FISCAL NOTE: COSTS TO STATE AND LOCAL GOVERNMENT

Walter Perry, Analyst, Strategic Planning and Assessment Section, has determined that, for the first five-year period the proposed rule amendments are in effect, no fiscal implications are anticipated for the agency, and no significant fiscal implications are anticipated for other units of state or local government.

The proposed rulemaking would make numerous amendments to TAC §290.38, 290.39, and 290.41 - 290.47. Many of the proposed changes would incorporate rule interpretations, staff guidance, and agency policies relating to the design and operation of public water systems. The proposed rules relate to the construction of emergency wells, the use of PVC well casing, procedures for cementing well

casing in the drill hole, the use of chloramines, the design of pressure tanks at noncommunity water systems with wells, and the distinction between premises cross-connection control and internal cross-connection control programs. The rule changes would also explicitly allow the use of high-density polyethylene pipe in potable water distribution systems, the use of elastomeric duckbill valves and other devices as alternatives to hinged flap valves on storage tank overflow pipes, and the use of alternative calibration procedures for continuous disinfectant residual analyzers.

Several of the proposed rule changes could potentially apply to most of the 6,693 public water systems across the state. Of these, 960 are owned or operated by cities or municipalities, 854 by municipal utility districts, 148 by state entities, 114 by federal entities, and 71 by county entities. Of the remaining water systems, 3,527 are owned or operated by private individuals or businesses and 1,019 by water supply corporations.

Proposed changes to §290.43 are related to the design of overflow pipes for potable water storage tanks. The changes would allow water systems to cover the outlet of the overflow pipe with an elastomeric duckbill valve or other device in lieu of a gravity-weighted hinged flap valve. The water systems would not be required to use the elastomeric duckbill valve, but would be allowed to use the valve as an alternative to the hinged flap valve. It is projected that any additional cost for the elastomeric duckbill valve over the gravity-weighted hinged flap valve would be negligible.

The proposed changes to §290.44 would update the commission's design requirements for potable water distribution systems that are constructed using plastic pipe. The proposed amendments would explicitly allow the use of high-density polyethylene (HDPE) pipe, incorporate the current review and approval

practices of the commission's staff as they relate to HDPE and polyvinyl chloride (PVC) that meets American Water Works Association (AWWA) standards, and ensure a more reliable operation by increasing the minimum wall thickness required for PVC water lines that meet American Society of Testing and Materials (ASTM) Standard D-2241. It is projected that the thicker-walled ASTM PVC pipe would cost 22.5% more than the current thickness requirement. For a pipe project, it is projected that overall costs would increase between 3-6%. Currently, 90% of the distribution system plans reviewed by the Water Supply Division meet the proposed requirements. Under the proposed rules, the remaining 10% could avoid additional costs and continue using the thinner-walled piping if a professional engineer provides the agency with the calculations and assumptions used to determine that the integrity of the system will not be compromised by the use of thinner-walled materials.

The rule changes would also amend §290.46 to allow treatment plants to use alternative methods and procedures to verify the accuracy of their benchtop and continuous (on-line) disinfectant residual analyzers and require the treatment plant to recalibrate the analyzer if necessary. It is projected that this change in policy would result in a cost savings to public water systems. The actual amount of savings would depend both on the type of analyzer used and the calibration procedures specified by the manufacturer. The projected cost savings per facility is $500 per year.

PUBLIC BENEFITS AND COSTS

Mr. Perry also determined that for each year of the first five years the proposed new rules are in effect, the public benefit anticipated from the changes seen in the proposed rules will be greater compliance alternatives for public water systems. This has the potential to have a positive impact on the ability of public water systems to provide services to their customers.

The proposed rule changes would have no significant fiscal impact for businesses or individuals who own or operate public water systems. As identified in §290.44, the design requirements for potable water distribution systems that are constructed using plastic pipe would be amended to incorporate the current review and approval practices of the commission's staff as they relate to the use of high-density polyethylene (HDPE) and AWWA polyvinyl chloride (PVC) water lines to increase the minimum wall thickness required for ASTM PVC water lines. This proposed change may impact approximately 10% of all public water systems installing new pipe. However these systems could avoid an additional 3-6% increase in costs and continue using the thinner-walled piping if a professional engineer provides the agency with the calculations and assumptions used to determine that the integrity of the system will not be compromised by the thinner-walled materials.

The rule changes for §290.46, which would allow treatment plants to use alternative methods and procedures to verify the accuracy of their benchtop and continuous (on-line) disinfectant residual analyzers, could result in a cost savings. The actual amount of savings would depend both on the type of analyzer used and the calibration procedures specified by the manufacturer. The projected savings per facility is $500 per year.

SMALL BUSINESS AND MICRO-BUSINESS ASSESSMENT

No adverse fiscal implications are anticipated for small or micro-businesses as a result of the proposed rulemaking. There are 3,527 water systems owned or operated by private individuals or businesses and 1,019 by water supply corporations. It is not known how many of these water systems are small or micro-businesses. The change in rules would result in minimal expense for public water systems owned by small and micro-businesses. Small and micro-businesses would experience the same potential

expenses and cost savings as local governments and industry. No equipment upgrades or replacements would be required as a result of the rule changes.

LOCAL EMPLOYMENT IMPACT STATEMENT

The commission reviewed this proposed rulemaking and determined that a local employment impact statement is not required because the proposed rules do not adversely affect a local economy in a material way for the first five years that the proposed rules are in effect.

REGULATORY IMPACT ANALYSIS DETERMINATION

The commission reviewed the proposed rulemaking in light of the regulatory analysis requirements of Texas Government Code §2001.0225 and determined that the rulemaking is not subject to §2001.0225 because it does not meet the definition of a "major environmental rule" as defined in the act. A "major environmental rule" means a rule, the specific intent of which, is to protect the environment or reduce risks to human health from exposure and that may adversely affect in a material way, the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. The commission has determined that the proposed rulemaking does not fall under the definition of a “major environmental rule” because none of the proposed rules mandate new requirements for public water systems. Rather, the proposed rules incorporate existing review and approval practices already used by the commission into the rules, clarifies existing rules, corrects typographical errors, and offers water systems alternative ways of complying with existing regulatory requirements.

Furthermore, the proposed rulemaking does not meet any of the four applicability requirements listed in Texas Government Code §2001.0225(a). This section only applies to a major environmental rule, the result of which is to: 1) exceed a standard set by federal law, unless the rule is specifically required by state law; 2) exceed an express requirement of state law, unless the rule is specifically required by federal law; 3) exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement a state and federal program; or 4) adopt a rule solely under the general powers of the agency instead of under a specific state law. This rulemaking does not meet any of these four applicability requirements because this rulemaking: 1) does not exceed any standard set by federal law for treatment of water utilized in public water systems and is proposed to be consistent with federal rules; 2) does not exceed the requirements of state law under Texas Health and Safety Code, Chapter 341, Subchapter C; 3) does not exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement any state and federal program on treatment of water utilized in public water systems, but rather is consistent with federal rules in order to allow the state to maintain its authority to implement the federal Safe Drinking Water Act; and 4) is not proposed solely under the general powers of the agency, but rather specifically under Texas Health and Safety Code, §341.031, which allows the commission to adopt and enforce rules to implement the federal Safe Drinking Water Act, as well as the other general powers of the agency.

TAKINGS IMPACT ASSESSMENT

The commission evaluated these proposed rules and performed a preliminary assessment of whether these proposed rules constitute a takings under Texas Government Code, Chapter 2007. The specific purposes of these proposed rules are to: 1) incorporate into commission rules various staff guidance

documents related to the design and operation of public water systems; 2) amend current rules regarding backflow prevention by public water systems to clarify installation and testing requirements and to distinguish cross-connection controls that occur at the customer meter from controls that occur within customer premises; 3) to establish alternate capacity requirements for water systems that provide wholesale treated water to other public water systems; and 4) to amend current rules to allow treatment plants with continuous disinfection residual analyzers to use alternative calibration procedures for verifying the accuracy of their instruments. The purposes of the other proposed changes are to revise two definitions in § 290.38, replace several general statements with references to specific regulatory requirements in §§ 290.44 and 290.46, and provide non-substantive revisions, including typographical error and sentence structure corrections throughout Subchapter F.

Promulgation and enforcement of the proposed amendments would constitute neither a statutory nor a constitutional taking of private real property. There are no burdens imposed on private real property under this rulemaking because the proposed amendments neither relate to, nor have any impact on the use or enjoyment of private real property, and there would be no reduction in value of property as a result of this rulemaking. None of the proposed rules mandate any new requirements, but rather, clarify existing requirements by incorporating staff guidance documents into the rules, incorporating into the rules alternatives to compliance that previously required commission approval, and clarifying language, definitions and indices existing in rules previously adopted by the commission.

CONSISTENCY WITH THE COASTAL MANAGEMENT PROGRAM

The commission reviewed the proposed rules and found that they are neither identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(b)(2) or (4), nor will they affect any

action/authorization identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(a)(6). Therefore, the proposed rules are not subject to the Texas Coastal Management Program.

ANNOUNCEMENT OF HEARING

A public hearing on this proposal will be held in Austin on [date] at 10:00 A.M, 12100 Park 35 Circle, Building F, Room 2210. Individuals may present oral or written statements when called upon in order of registration. There will be no open discussion during the hearing; however, an agency staff member will be available to discuss the proposal 30 minutes prior to the hearing and will answer questions before and after the hearing.

Persons with disabilities who have special communication or other accommodation needs who are planning to attend the hearing should contact Joyce Spencer, the Texas Register Team, at (512) 239-5017. Requests should be made as far in advance as possible.

SUBMITTAL OF COMMENTS

Comments may be submitted to Joyce Spencer, MC 205, Texas Register Team, Office of Legal Services, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087, or faxed to (512) 239-4808. All comments should reference Rule Project Number 2005-025-290-WT. Comments must be received by 5:00 p.m., Monday, October 10, 2005. For further information, please contact Marlo Wanielista Berg, P.E., Water Supply Division, at (512) 239-6967.

SUBCHAPTER D: RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS

STATUTORY AUTHORITY

These amendments are proposed under Texas Water Code, §5.102, which establishes the commission's general authority necessary to carry out its jurisdiction; §5.103, which establishes the commission's general authority to adopt rules to carry out its duties under the Texas Water Code and the other laws of the state; §5.105, which establishes the commission's authority to set policy by rule; and Texas Health and Safety Code, §341.031, which allows the commission to adopt rules to implement the federal Safe Drinking Water Act, 42 United States Code, §§300f to 300j-26.

The proposed amendments implement Texas Health and Safety Code, §341.031 and §341.0315, which require public water systems to comply with commission rules adopted to ensure the supply of safe drinking water.

§290.38 Definitions

The following words and terms, when used in this chapter shall have the following meanings, unless the context clearly indicates otherwise. If a word or term used in this chapter is not contained in the following list, its definition shall be as shown in Title 40 Code of Federal Regulations (CFR) 141.2. Other technical terms used shall have the meanings or definitions listed in the latest edition of The Drinking Water Dictionary, prepared by the American Water Works Association.

(1) Air gap - The unobstructed vertical <u>separation</u> distance through the free atmosphere between the lowest opening from any pipe or faucet conveying water to a tank, fixture, receptor, sink,

or other assembly and the flood level rim of the receptacle. The vertical[, physical] separation distance must be at least twice the diameter of the water supply outlet[,] but never less than 1.0 inch.

(2) ANSI standards - The standards of the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

(3) Approved laboratory - A laboratory certified and approved by the commission to analyze water samples to determine their compliance with maximum allowable constituent levels.

(4) ASME standards - The standards of the American Society of Mechanical Engineers, 346 East 47th Street, New York, New York 10017.

(5) ASTM standards - The standards of the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19102.

(6) Auxiliary power - Either mechanical power or electric generators which can enable the system to provide water under pressure to the distribution system in the event of a local power failure. With the approval of the executive director, dual primary electric service may be considered as auxiliary power in areas which are not subject to large scale power outages due to natural disasters.

(7) AWWA standards - The latest edition of the applicable standards as approved and published by the American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235.

(8) Certified laboratory - A laboratory certified by the commission to analyze water samples to determine their compliance with maximum allowable constituent levels.

(9) Community water system - A public water system which has a potential to serve at least 15 residential service connections on a year-round basis or serves at least 25 residents on a year-round basis.

(10) Connection A single family residential unit or each commercial or industrial establishment to which drinking water is supplied from the system. As an example, the number of service connections in an apartment complex would be equal to the number of individual apartment units. When enough data is not available to accurately determine the number of connections to be served or being served, the population served divided by three will be used as the number of connections for calculating system capacity requirements. Conversely, if only the number of connections is known, the connection total multiplied by three will be the number used for population served. For the purposes of this definition, a dwelling or business which is connected to a system that delivers water by a constructed conveyance other than a pipe shall not be considered a connection if:

(A) the water is used exclusively for purposes other than those defined as human consumption (see human consumption);

(B) the executive director determines that alternative water to achieve the equivalent level of public health protection provided by the drinking water standards is provided for residential or similar human consumption, including, but not limited to, drinking and cooking; or

(C) the executive director determines that the water provided for residential or similar human consumption is centrally treated or is treated at the point of entry by a provider, a pass through entity, or the user to achieve the equivalent level of protection provided by the drinking water standards.

(11) Contamination - The presence of any foreign substance (organic, inorganic, radiological or biological) in water which tends to degrade its quality so as to constitute a health hazard or impair the usefulness of the water.

(12) Cross-connection - A physical connection between a public water system and either another supply of unknown or questionable quality, any source which may contain contaminating or polluting substances, or any source of water treated to a lesser degree in the treatment process.

(13) Disinfectant - Any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone added to the water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogenic microorganisms.

(14) Disinfection - A process which inactivates pathogenic organisms in the water by chemical oxidants or equivalent agents.

(15) Distribution system - A system of pipes that conveys potable water from a treatment plant to the consumers. The term includes pump stations, ground and elevated storage tanks,

potable water mains, and potable water service lines and all associated valves, fittings, and meters, but excludes potable water customer service lines.

(16) Drinking water - All water distributed by any agency or individual, public or private, for the purpose of human consumption or which may be used in the preparation of foods or beverages or for the cleaning of any utensil or article used in the course of preparation or consumption of food or beverages for human beings. The term "Drinking Water" shall also include all water supplied for human consumption or used by any institution catering to the public.

(17) Drinking water standards - The commission rules covering drinking water standards in Subchapter F of this chapter (relating to Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems).

(18) Elevated storage capacity - That portion of water which can be stored at least 80 feet above the highest service connection in the pressure plane served by the storage tank.

(19) Emergency power - Either mechanical power or electric generators which can enable the system to provide water under pressure to the distribution system in the event of a local power failure. With the approval of the executive director, dual primary electric service may be considered as emergency power in areas which are not subject to large scale power outages due to natural disasters.

(20) Groundwater - Any water that is located beneath the surface of the ground and is not under the direct influence of surface water.

(21) Groundwater under the direct influence of surface water - Any water beneath the surface of the ground with:

(A) significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium;* or

(B) significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions.

(22) Health hazard - A cross-connection, potential contamination hazard, or other situation involving any substance that can cause death, illness, spread of disease, or has a high probability of causing such effects if introduced into the potable drinking water supply.

(23) Human consumption - Uses by humans in which water can be ingested into or absorbed by the human body. Examples of these uses include, but are not limited to drinking, cooking, brushing teeth, bathing, washing hands, washing dishes, and preparing foods.

(24) Interconnection - A physical connection between two public water supply systems.

(25) Intruder-resistant fence - A fence six feet or greater in height, constructed of wood, concrete, masonry, or metal with three strands of barbed wire extending outward from the top of the fence at a 45 degree angle with the smooth side of the fence on the outside wall. In lieu of the barbed wire, the fence must be eight feet in height. The fence must be in good repair and close enough to surface grade to prevent intruder passage.

(26) L/d ratio - The dimensionless value that is obtained by dividing the length (depth) of a granular media filter bed by the weighted effective diameter "d" of the filter media. The weighted effective diameter of the media is calculated based on the percentage of the total bed depth contributed by each media layer.

(27) Licensed professional engineer - An engineer who maintains a current license through the Texas Board of Professional Engineers in accordance with its requirements for professional practice.

(28) Maximum daily demand - In the absence of verified historical data or in cases where a public water system has imposed mandatory water use restrictions within the past 36 months, maximum daily demand means 2.4 times the average daily demand of the system.

(29) Maximum contaminant level (MCL) - The MCL for a specific contaminant is defined in the section relating to that contaminant.

(30) Milligrams per liter (mg/L) - A measure of concentration, equivalent to and replacing parts per million in the case of dilute solutions.

(31) Monthly reports of water works operations - The daily record of data relating to the operation of the system facilities compiled in a monthly report.

(32) National Fire Protection Association (NFPA) standards - The standards of the NFPA 1 Batterymarch Park, Quincy, Massachusetts, 02269-9101.

(33) National Sanitation Foundation (NSF) - The NSF or reference to the listings developed by the foundation, P.O. Box 1468, Ann Arbor, Michigan 48106.

(34) Noncommunity water system - Any public water system which is not a community system.

(35) Nonhealth hazard - A cross-connection, potential contamination hazard, or other situation involving any substance that generally will not be a health hazard, but will constitute a nuisance, or be aesthetically objectionable, if introduced into the public water supply.

(36) Nontransient noncommunity water system - A public water system that is not a community water system and regularly serves at least 25 of the same persons at least six months out of the year.

(37) psi - Pounds per square inch.

(38) Peak hourly demand - In the absence of verified historical data, peak hourly demand means 1.25 times the maximum daily demand (prorated to an hourly rate) if a public water supply meets the commission's minimum requirements for elevated storage capacity and 1.85 times the maximum daily demand (prorated to an hourly rate) if the system uses pressure tanks or fails to meet the commission's minimum elevated storage capacity requirement.

(39) Plumbing inspector - Any person employed by a political subdivision for the purpose of inspecting plumbing work and installations in connection with health and safety laws and ordinances, who has no financial or advisory interest in any plumbing company, and who has successfully fulfilled the examinations and requirements of the Texas State Board of Plumbing Examiners.

(40) Plumbing ordinance - A set of rules governing plumbing practices which is at least as stringent and comprehensive as one of the following nationally recognized codes:

(A) the International Plumbing Code; or

(B) the Uniform Plumbing Code.

(41) Potable water customer service line - The sections of potable water pipe between the customer's meter and the customer's point of use.

(42) Potable water service line - The section of pipe between the potable water main to the customer's side of the water meter. In cases where no customer water meter exists, it is the section of pipe that is under the ownership and control of the public water system.

(43) Potable water main - A pipe or enclosed constructed conveyance operated by a public water system which is used for the transmission or distribution of drinking water to a potable water service line.

(44) Potential contamination hazard - A condition which, by its location, piping or configuration, has a reasonable probability of being used incorrectly, through carelessness, ignorance, or negligence, to create or cause to be created a backflow condition by which contamination can be introduced into the water supply. Examples of potential contamination hazards are:

(A) bypass arrangements;

(B) jumper connections;

(C) removable sections or spools; and

(D) swivel or changeover assemblies.

(45) Public drinking water program - Agency staff designated by the executive director to administer the Safe Drinking Water Act and state statutes related to the regulation of public drinking

water. Any report required to be submitted in this chapter to the executive director must be submitted to the Texas Commission on Environmental Quality, Water Supply Division, MC 155, P.O. Box 13087, Austin, Texas 78711-3087.

(46) Public health engineering practices - Requirements in this subchapter or guidelines promulgated by the executive director.

(47) Public water system - A system for the provision to the public of water for human consumption through pipes or other constructed conveyances, which includes all uses described under the definition for drinking water. Such a system must have at least 15 service connections or serve at least 25 individuals at least 60 days out of the year. This term includes; any collection, treatment, storage, and distribution facilities under the control of the operator of such system and used primarily in connection with such system, and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. Two or more systems with each having a potential to serve less than 15 connections or less than 25 individuals but owned by the same person, firm, or corporation and located on adjacent land will be considered a public water system when the total potential service connections in the combined systems are 15 or greater or if the total number of individuals served by the combined systems total 25 or greater at least 60 days out of the year. Without excluding other meanings of the terms "individual" or "served," an individual shall be deemed to be served by a water system if he lives in, uses as his place of employment, or works in a place to which drinking water is supplied from the system.

(48) Sanitary control easement - A legally binding document securing all land, within 150 feet of a public water supply well location, from pollution hazards. This document must fully describe the location of the well and surrounding lands and must be filed in the county records to be legally binding.

(49) Sanitary survey - An onsite review of the water source, facilities, equipment, operation and maintenance of a public water system, for the purpose of evaluating the adequacy for producing and distributing safe drinking water.

(50) Service line - A pipe connecting the utility service provider's main and the water meter, or for wastewater, connecting the main and the point at which the customer's service line is connected, generally at the customer's property line.

(51) Service pump - Any pump that takes treated water from storage and discharges to the distribution system.

(52) Transfer pump - Any pump which conveys water from one point to another within the treatment process or which conveys water to storage facilities prior to distribution.

(53) Transient noncommunity water system - A public water system that is not a community water system and serves at least 25 persons at least 60 days out of the year, yet by its characteristics, does not meet the definition of a nontransient noncommunity water system.

(54) Uniform Fire Code - The standards of the International Conference of Building Officials, 5360 Workman Mill Road, Whittier, California, 90601-2298.

(55) Wastewater lateral - Any pipe or constructed conveyance carrying wastewater, running laterally down a street, alley, or easement, and receiving flow only from the abutting properties.

(56) Wastewater main - Any pipe or constructed conveyance which receives flow from one or more wastewater laterals.

§290.39 General Provisions.

(a) Authority for requirements. Texas Health and Safety Code (THSC), Chapter 341, Subchapter C prescribes the duties of the commission relating to the regulation and control of public drinking water systems in the state. The statute requires that the commission ensure that public water systems: supply safe drinking water in adequate quantities, are financially stable and technically sound, promote use of regional and area-wide drinking water systems, and review completed plans and specifications and business plans for all contemplated public water systems not exempted by THSC, §341.035(d). The statute also requires the commission be notified of any subsequent material changes, improvements, additions, or alterations in existing systems and, consider compliance history in approving new or modified public water systems.

(b) Reason for this subchapter and minimum criteria. This subchapter has been adopted to ensure regionalization and area-wide options are fully considered, the inclusion of all data essential for comprehensive consideration of the contemplated project, or improvements, additions, alterations, or changes thereto and to establish minimum standardized public health design criteria in compliance with existing state statutes and in accordance with good public health engineering practices. In addition, minimum acceptable financial, managerial, technical, and operating practices must be specified to ensure that facilities are properly operated to produce and distribute a safe, potable water.

(c) Required actions and approvals prior to construction. A person may not begin construction of a public drinking water supply system unless the executive director determines the following requirements have been satisfied and approves construction of the proposed system.

(1) A person proposing to install a public drinking water system within the extraterritorial jurisdiction of a municipality; or within 1/2-mile of the corporate boundaries of a district, or other political subdivision providing the same service; or within 1/2-mile of a certificated service area boundary of any other water service provider shall provide to the executive director evidence that:

(A) written application for service was made to that provider; and

(B) all application requirements of the service provider were satisfied, including the payment of related fees.

(2) A person may submit a request for an exception to the requirements of paragraph (1) of this subsection if the application fees will create a hardship on the person. The request must be accompanied by evidence documenting the financial hardship.

(3) A person who is not required to complete the steps in paragraph (1) of this subsection, or who completes the steps in paragraph (1) of this subsection and is denied service or determines that the existing provider's cost estimate is not feasible for the development to be served, shall submit to the executive director:

(A) plans and specifications for the system; and

(B) a business plan for the system.

(d) Submission of plans.

(1) Plans, specifications, and related documents will not be considered unless they have been prepared under the direction of a licensed professional engineer. All engineering documents must have engineering seals, signatures, and dates affixed in accordance with the rules of the Texas Board of Professional Engineers.

(2) Detailed plans must be submitted for examination at least 30 days prior to the time that approval, comments or recommendations are desired. From this, it is not to be inferred that final action will be forthcoming within the time mentioned. To request authorization for well construction on

an emergency basis, the water system owner, representative or professional engineer shall contact the appropriate Regional Office for approval.

(A) All state minimum requirements regarding well construction shall be met.

(B) Before placing a well into service, engineering plans and specifications for the completed well and well completion data shall be submitted to the executive director within 30 days of the date of the letter approving the emergency construction.

(3) The limits of approval are as follows.

(A) The commission's public drinking water program furnishes consultation services as a reviewing body only, and its licensed professional engineers may neither act as design engineers nor furnish detailed estimates.

(B) The commission's public drinking water program does not examine plans and specifications in regard to the structural features of design, such as strength of concrete or adequacy of reinforcing. Only the features covered by this subchapter will be reviewed.

(C) The consulting engineer and/or owner must provide surveillance adequate to assure that facilities will be constructed according to approved plans and must notify the executive director in writing upon completion of all work. Planning materials shall be submitted to the Texas

Commission on Environmental Quality, Water Supply Division, MC 153, P.O. Box 13087, Austin, Texas 78711-3087.

(e) Submission of planning material. In general, the planning material submitted shall conform to the following requirements.

(1) Engineering reports are required for new water systems and all surface water treatment plants. Engineering reports are also required when design or capacity deficiencies are identified in an existing system. The engineering report shall include, at least, coverage of the following items:

(A) statement of the problem or problems;

(B) present and future areas to be served, with population data;

(C) the source, with quantity and quality of water available;

(D) present and estimated future maximum and minimum water quantity demands;

(E) description of proposed site and surroundings for the water works facilities;

(F) type of treatment, equipment, and capacity of facilities;

(G) basic design data, including pumping capacities, water storage and flexibility of system operation under normal and emergency conditions; and

(H) the adequacy of the facilities with regard to delivery capacity and pressure throughout the system.

(2) All plans and drawings submitted may be printed on any of the various papers which give distinct lines. All prints must be clear, legible and assembled to facilitate review.

(A) The relative location of all facilities which are pertinent to the specific project shall be shown.

(B) The location of all abandoned or inactive wells within 1/4-mile of a proposed well site shall be shown or reported.

(C) If staged construction is anticipated, the overall plan shall be presented, even though a portion of the construction may be deferred.

(D) A general map or plan of the municipality, water district, or area to be served shall accompany each proposal for a new water supply system.

(3) Specifications for construction of facilities shall accompany all plans. If a process or equipment which may be subject to probationary acceptance because of limited application or use in Texas is proposed, the executive director may give limited approval. In such a case, the owner must be given a bonded guarantee from the manufacturer covering acceptable performance. The specifications shall include a statement that such a bonded guarantee will be provided to the owner and shall also specify those conditions under which the bond will be forfeited. Such a bond will be transferrable. The bond shall be retained by the owner and transferred when a change in ownership occurs.

(4) A copy of each fully executed sanitary control easement and any other documentation demonstrating compliance with §290.41(c)(1)(F) of this title (relating to Water Sources) shall be provided to the executive director prior to placing the well into service. Each original easement document, if obtained, must be recorded in the deed records at the county courthouse. Section 290.47(c) of this title (relating to Appendices) includes a suggested form.

(5) Construction features and siting of all facilities for new water systems and for major improvements to existing water systems must be in conformity with applicable commission rules.

(f) Submission of business plans. The prospective owner of the system or the person responsible for managing and operating the system must submit a business plan to the executive director that demonstrates that the owner or operator of the system has available the financial, managerial, and technical capability to ensure future operation of the system in accordance with applicable laws and rules. The executive director may order the prospective owner or operator to demonstrate financial assurance to operate the system in accordance with applicable laws and rules as specified in Chapter 37,

Subchapter O of this title (relating to Financial Assurance for Public Drinking Water Systems and Utilities), or as specified by commission rule, unless the executive director finds that the business plan demonstrates adequate financial capability. A business plan shall include the information and be presented in a format prescribed by the executive director. For community water systems, the business plan shall contain, at a minimum, the following elements:

(1) description of areas and population to be served by the potential system;

(2) description of drinking water supply systems within a two-mile radius of the proposed system, copies of written requests seeking to obtain service from each of those drinking water supply systems, and copies of the responses to the written requests;

(3) time line for construction of the system and commencement of operations;

(4) identification of and costs of alternative sources of supply;

(5) selection of the alternative to be used and the basis for that selection;

(6) identification of the person or entity which owns or will own the drinking water system and any identifiable future owners of the drinking water system;

(7) identification of any other businesses and public drinking water system(s) owned or operated by the applicant, owner(s), parent organization, and affiliated organization(s);

(8) an operations and maintenance plan which includes sufficient detail to support the budget estimate for operation and maintenance of the facilities;

(9) assurances that the commitments and resources needed for proper operation and maintenance of the system are, and will continue to be, available, including the qualifications of the organization and each individual associated with the proposed system;

(10) for retail public utilities as defined by Texas Water Code (TWC), §13.002:

(A) projected rate revenue from residential, commercial, and industrial customers; and

(B) pro forma income, expense, and cash flow statements;

(11) identification of any appropriate financial assurance, including those being offered to capital providers;

(12) a notarized statement signed by the owner or responsible person that the business plan has been prepared under his direction and that he is responsible for the accuracy of the information; and

(13) other information required by the executive director to determine the adequacy of the business plan or financial assurance.

(g) Business plans not required. A person is not required to file a business plan if the person:

(1) is a county;

(2) is a retail public utility as defined by TWC, §13.002, unless that person is a utility as defined by that section;

(3) has executed an agreement with a political subdivision to transfer the ownership and operation of the water supply system to the political subdivision; or

(4) is a noncommunity nontransient water system and the person has demonstrated financial assurance under THSC, Chapter 361 or 382 or TWC, Chapter 26.

(h) Beginning and completion of work.

(1) No person may begin construction on a new public water system before receiving written approval of plans and specifications and, if required, approval of a business plan from the executive director. No person may begin construction of modifications to a public water system without providing notification to the executive director and submitting and receiving approval of plans and specifications if requested in accordance with subsection (j) of this section.

(2) The executive director shall be notified in writing by the design engineer or the owner before construction is started.

(3) Upon completion of the water works project, the engineer or owner shall notify the executive director in writing as to its completion and attest to the fact that the completed work is substantially in accordance with the plans and change orders on file with the commission.

(i) Changes in plans and specifications. Any addenda or change orders which may involve a health hazard or relocation of facilities, such as wells, treatment units, and storage tanks, shall be submitted to the executive director for review and approval.

(j) Changes in existing systems or supplies. Public water systems shall notify the executive director prior to making any significant change or addition to the system's production, treatment, storage, pressure maintenance, or distribution facilities. Public water systems shall submit plans and specifications for the proposed changes upon request. Changes to an existing disinfection process at a treatment plant that treats surface water or groundwater that is under the direct influence of surface water shall not be instituted without the prior approval of the executive director.

(1) The following changes are considered to be significant:

(A) proposed changes to existing systems which result in an increase or decrease in production, treatment, storage, or pressure maintenance capacity;

(B) proposed changes to the disinfection process used at plants that treat surface water or groundwater that is under the direct influence of surface water including changes

involving the disinfectants used, the disinfectant application points, or the disinfectant monitoring points;

(C) proposed changes to the type of disinfectant used to maintain a disinfectant residual in the distribution system;

(D) proposed changes in existing distribution systems when the change is greater than 10% of the existing distribution capacity or 250 connections, whichever is smaller, or results in the water system's inability to comply with any of the applicable capacity requirements of §290.45 of this title (relating to Minimum Water System Capacity Requirements); and

(E) any other material changes specified by the executive director.

(2) The executive director shall determine whether engineering plans and specifications will be required after reviewing the initial notification regarding the nature and extent of the modifications.

(A) Upon request of the executive director, the water system shall submit plans and specifications in accordance with the requirements of subsection (d) of this section.

(B) Unless plans and specifications are required by Chapter 293 of this title (relating to Water Districts), the executive director will not require another state agency or a political

subdivision to submit planning material on distribution line improvements if the entity has its own internal review staff and complies with all of the following criteria:

(i) the internal review staff includes one or more licensed professional engineers that are employed by the political subdivision and must be separate from, and not subject to the review or supervision of, the engineering staff or firm charged with the design of the distribution extension under review;

(ii) a licensed professional engineer on the internal review staff determines and certifies in writing that the proposed distribution system changes comply with the requirements of §290.44 of this title (relating to Water Distribution) and will not result in a violation of any provision of §290.45 of this title;

(iii) the state agency or political subdivision includes a copy of the written certification described in this subparagraph with the initial notice that is submitted to the executive director.

(C) Unless plans and specifications are required by Chapter 293 of this title, the executive director will not require planning material on distribution line improvements from any public water system that is required to submit planning material to another state agency or political subdivision that complies with the requirements of subparagraph (B) of this paragraph. The notice to the executive director must include a statement that a state statute or local ordinance requires the

planning materials to be submitted to the other state agency or political subdivision and a copy of the written certification that is required in subparagraph (B) of this paragraph.

(3) If a certificate of convenience and necessity (CCN) is required or must be amended, the CCN application must be included with the notice to the executive director.

(k) Planning material acceptance. Planning material for improvements to an existing system which does not meet the requirements of all sections of this subchapter will not be considered unless the necessary modifications for correcting the deficiencies are included in the proposed improvements, or unless the executive director determines that reasonable progress is being made toward correcting the deficiencies and no immediate health hazard will be caused by the delay.

(l) Exceptions. Requests for exceptions to one or more of the requirements in this subchapter shall be considered on an individual basis. Any water system which requests an exception must demonstrate to the satisfaction of the executive director that the exception will not compromise the public health or result in a degradation of service or water quality.

(1) The exception must be requested in writing and must be substantiated by carefully documented data. The request for an exception shall precede the submission of engineering plans and specifications for a proposed project for which an exception is being requested.

(2) Any exception granted by the commission is subject to revocation.

(3) Any request for an exception which is not approved by the commission in writing is denied.

(m) Notification of system startup or reactivation. The owner or responsible official must provide written notification to the commission of the startup of a new public water supply system or reactivation of an existing public water supply system. This notification must be made immediately upon meeting the definition of a public water system as defined in §290.38 of this title (relating to Definitions).

(n) The commission may require the owner or operator of a public drinking water supply system that was constructed without the approval required by (THSC), §341.035, that has a history of noncompliance with (THSC), Chapter 341, Subchapter C or commission rules, or that is subject to a commission enforcement action to take the following action:

(1) provide the executive director with a business plan that demonstrates that the system has available the financial, managerial, and technical resources adequate to ensure future operation of the system in accordance with applicable laws and rules. The business plan must fulfill all the requirements for a business plan as set forth in subsection (f) of this section;

(2) provide adequate financial assurance of the ability to operate the system in accordance with applicable laws and rules. The executive director will set the amount of the financial assurance, after the business plan has been reviewed and approved by the executive director.

(A) The amount of the financial assurance will equal the difference between the amount of projected system revenues and the projected cash needs for the period of time prescribed by the executive director.

(B) The form of the financial assurance will be as specified in Chapter 37, Subchapter O of this title and will be as specified by the executive director.

(C) If the executive director relies on rate increases or customer surcharges as the form of financial assurance, such funds shall be deposited in an escrow account as specified in Chapter 37, Subchapter O of this title and released only with the approval of the executive director.

§290.40 Cessation of Construction and Operations

(a) A public water supply system shall stop operations on receipt of a written notification of the executive director or an order of the commission issued under this section.

(b) The executive director or the commission may order a public water supply system to stop operations if:

(1) The system was constructed without approved plans and specifications and a business plan as required under §290.39 of this title (relating to General Provisions); or

(2) The executive director determines that the system presents an imminent health hazard.

(c) A notification or order issued under this section may be delivered by facsimile, by personal service, or by mail.

(d) A water supply system subject to notification or an order under this section, on written request, is entitled to an opportunity to be heard by the commissioners at a commission meeting.

(e) The public water supply system may not resume operations until the commission, the executive director, or a court authorizes the resumption.

(f) No person or entity may construct or operate a public drinking water system in violation of these sections or the drinking water standards.

(g) No person or entity may distribute drinking water to the public in violation of these sections or the drinking water standards.

§290.41 Water Sources.

(a) Water quality. The quality of water to be supplied must meet the quality criteria prescribed by the commission's drinking water standards contained in Subchapter F of this chapter (relating to

Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems).

(b) Water quantity. Sources of supply, both ground and surface, shall have a safe yield capable of supplying the maximum daily demands of the distribution system during extended periods of peak usage and critical hydrologic conditions. The pipelines and pumping capacities to treatment plants or distribution systems shall be adequate for such water delivery. Minimum capacities required are specified in §290.45 of this title (relating to Minimum Water System Capacity Requirements).

(c) Groundwater sources and development.

(1) Groundwater sources shall be located so that there will be no danger of pollution from flooding or from insanitary surroundings, such as privies, sewage, sewage treatment plants, livestock and animal pens, solid waste disposal sites or underground petroleum and chemical storage tanks and liquid transmission pipelines, or abandoned and improperly sealed wells.

(A) No well site which is within 50 feet of a tile or concrete sanitary sewer, sewerage appurtenance, septic tank, storm sewer, or cemetery; or which is within 150 feet of a septic tank perforated drainfield, areas irrigated by low dosage, low angle spray on-site sewage facilities, absorption bed, evapotranspiration bed, improperly constructed water well, or underground petroleum and chemical storage tank or liquid transmission pipeline will be acceptable for use as a public drinking water supply. Sanitary or storm sewers constructed of ductile iron or polyvinyl chloride (PVC) pipe meeting American Water Works Association (AWWA) standards, having a minimum working pressure

of 150 pounds per square inch (psi) or greater, and equipped with pressure type joints may be located at distances of less than 50 feet from a proposed well site, but in no case shall the distance be less than ten feet.

(B) No well site shall be located within 500 feet of a sewage treatment plant or within 300 feet of a sewage wet well, sewage pumping station, or a drainage ditch which contains industrial waste discharges or the wastes from sewage treatment systems.

(C) No water wells shall be located within 500 feet of animal feed lots, solid waste disposal sites, lands on which sewage plant or septic tank sludge is applied, or lands irrigated by sewage plant effluent.

(D) Livestock in pastures shall not be allowed within 50 feet of water supply wells.

(E) All known abandoned or inoperative wells (unused wells that have not been plugged) within 1/4-mile of a proposed well site shall be reported to the commission along with existing or potential pollution hazards. These reports are required for community and nontransient, noncommunity groundwater sources. Examples of existing or potential pollution hazards which may affect groundwater quality include, but are not limited to: landfill and dump sites, animal feedlots, military facilities, industrial facilities, wood-treatment facilities, liquid petroleum and petrochemical production, storage, and transmission facilities, Class 1, 2, 3, and 4 injection wells, and pesticide storage and mixing facilities. This information must be submitted prior to construction or as required by the executive director.

(F) A sanitary control easement or sanitary control easements covering land within 150 feet of the well, or executive director approval for a substitute authorized by this subsection, shall be obtained.

(i) The sanitary control easement(s) secured shall provide that none of the pollution hazards covered in subparagraphs (A) - (E) of this paragraph, or any facilities that might create a danger of pollution to the water to be produced from the well, will be located thereon.

(ii) For the purpose of a sanitary control easement, an improperly constructed water well is one which fails to meet the surface and subsurface construction standards for public water supply wells. Residential type wells within a sanitary control easement must be constructed to public water well standards.

(iii) A copy of the recorded sanitary control easement(s) shall be included with plans and specifications submitted to the executive director for review.

(iv) With the approval of the executive director, the public water system may submit any of the following as a substitute for obtaining, recording, and submitting a copy of the recorded sanitary control easement(s) covering land within 150 feet of the well:

(I) a copy of the recorded deed and map demonstrating that the public water system owns all real property within 150 feet of the well;

(II) a copy of the recorded deed and map demonstrating that the public water system owns a portion of real property within 150 feet of the well, and a copy of the sanitary control easement(s) that the public water system has obtained, recorded, and submitted to the executive director applicable to the remaining portion of real property within 150 feet of the well not owned by the public water system; or

(III) for a political subdivision, a copy of an ordinance or land use restriction adopted and enforced by the political subdivision which provides an equivalent or higher level of sanitary protection to the well as a sanitary control easement.

(v) If the executive director approves a sanitary control easement substitute identified in clause (iv)(I) or (iv)(II) of this subparagraph for a public water system and the public water system conveys the property it owns within 150 feet of the well to another person or persons, the public water system must at that time obtain, record, and submit to the executive director a copy of the recorded sanitary control easement(s) applicable to the conveyed portion of the property within 150 feet of the well, unless the executive director approves a substitute identified in clause (iv) of this subparagraph.

(2) The premises, materials, tools, and drilling equipment shall be maintained so as to minimize contamination of the groundwater during drilling operation.

(A) Water used in any drilling operation shall be of safe sanitary quality. Water used in the mixing of drilling fluids or mud shall contain a chlorine residual of at least 0.5 milligrams per liter (mg/L).

(B) The slush pit shall be constructed and maintained so as to minimize contamination of the drilling mud.

(C) No temporary toilet facilities shall be maintained within 150 feet of the well being constructed unless they are of a sealed, leakproof type.

(3) The construction, disinfection, protection, and testing of a well to be used as a public water supply source must meet the following conditions.

(A) Before placing the well into service, a public water system shall furnish a copy of the well completion data, which includes the following items: the Driller's Log (geological log and material setting report); a cementing certificate; the results of a 36-hour pump test; the results of the microbiological and chemical analyses required by subparagraphs (F) and (G) of this paragraph; a legible copy of the recorded deed or deeds for all real property within 150 feet of the well; a legible copy of the sanitary control easement(s) or other documentation demonstrating compliance with paragraph (1)(F) of this subsection; an original or legible copy of a United States Geological Survey 7.5-minute topographic quadrangle showing the accurate well location to the executive director; and a map demonstrating the well location in relation to surrounding property boundaries. All the documents

listed in this paragraph must be approved by the executive director before final approval is granted for the use of the well.

(B) The casing material used in the construction of wells for public use shall be new carbon steel, high-strength low-alloy steel, stainless steel, or polyvinyl chloride (PVC) that conforms with the requirements of clauses (i) - (iv) of this subparagraph [or plastic]. The material shall conform to AWWA standards. The casing shall extend a minimum of 18 inches above the elevation of the finished floor of the pump room or natural ground surface and a minimum of one inch above the sealing block or pump motor foundation block when provided. The casing shall extend at least to the depth of the shallowest water formation to be developed and deeper, if necessary, in order to eliminate all undesirable water-bearing strata. Well construction materials containing more than 8.0% lead are prohibited.

(i) For PVC well casing, the pipe material and installation shall conform to ASTM F 480. The maximum standard dimension ratio (SDR) shall be 26 or less. The allowable length of the cemented PVC casing and the wall thickness shall be determined by the design engineer in accordance with ASTM F 480.

(ii) PVC well casing shall conform to American National Standards Institute/National Sanitation Foundation Standard (ANSI/NSF) Standard 14, bear the “NSF-wc” stamp, and have been certified by an organization accredited by ANSI.

(iii) PVC well casing may not be used in the construction of a well that is located within 150 feet of an underground petroleum or chemical storage tank or liquid petroleum transmission pipeline.

(iv) PVC well casing may not be used in the construction of a well that is located within the boundaries of a volatile organic compound (VOC) plume or contaminated soil, or if the capture zone of the proposed well will intersect groundwater containing VOCs in sufficient quantity to dissolve or degrade the PVC well casing.

(C) The annular space between the outside diameter of the well casing and the inside diameter of the borehole or outer well casing shall not be less than three inches in net diametrical difference and shall be sealed in accordance with the requirements of clauses (i) - (v) of this subparagraph. [The space between the casing and drill hole shall be sealed by using enough cement under pressure to completely fill and seal the annular space between the casing and the drill hole. The well casing shall be cemented in this manner from the top of the shallowest formation to be developed to the earth's surface. The driller shall utilize a pressure cementation method in accordance with the AWWA Standard for Water Wells (A100-97), Appendix C: Section C.3 (Positive Displacement Exterior Method); Section C.4 (Interior Method Without Plug); Section C.5 (Positive Placement, Interior Method, Drillable Plug); and Section C.6 (Placement Through Float Shoe Attached to Bottom of Casing). Cementation methods other than those listed in this subparagraph may be used on a site-specific basis with the prior written approval of the executive director. A cement bonding log, as well as any other documentation deemed necessary, may be required by the executive director to assure complete sealing of the annular space.]

(i) The annulus shall be sealed by using enough cement under pressure to completely fill and seal the annular space.

(ii) The well casing shall be cemented from the top of the shallowest formation to be developed, meaning the shallowest saturated deposit from which drinking water will be produced for the public water supply, to the earth's surface.

(iii) When sealing the annulus, the driller must use neat cement in accordance with the AWWA A100 Standard for Water Wells. Neat cement shall consist of a mixture of API Spec.10, Class A and water in the ratio of not more than 6.0 gallons of water per 94 pound sack of cement. A maximum of 6 percent, by weight, bentonite may be added. A bentonite plug may only be used in a water saturated zone, meaning a layer below the water table where the interstices are completely filled with water at all times, to seal the annular space above the packer. The plug may not exceed five feet in height and the entire plug shall sit below the water table at all times. The placement of the plug and seal shall be a continuous operation to minimize voids in the seal.

(iv) The driller shall utilize a pressure cementation method in accordance with the AWWA Standard for Water Wells (A100-97), Appendix C: Section C.3 (Positive Displacement Exterior Method); Section C.4 (Interior Method Without Plug); Section C.5 (Positive Placement, Interior Method, Drillable Plug); and Section C.6 (Placement Through Float Shoe Attached to Bottom of Casing). The Dump-Bailer Method (A100-97, Section C.1) and Tremie Method (A100-97 Section C.2) are not pressure cementation methods and shall not be used in cementing public water supply wells.

(v) A cement bonding log, as well as any other documentation deemed necessary, may be required by the executive director to assure complete sealing of the annular space.

(D) When a gravel packed well is constructed, all gravel shall be of selected and graded quality and shall be thoroughly disinfected with a 50 mg/L chlorine solution as it is added to the well cavity.

(E) Safeguards shall be taken to prevent possible contamination of the water or damage by trespassers following the completion of the well and prior to installation of permanent pumping equipment.

(F) Upon well completion, or after an existing well has been reworked, the well shall be disinfected in accordance with current AWWA standards for well disinfection except that the disinfectant shall remain in the well for at least six hours.

(i) Before placing the well in service, the water containing the disinfectant shall be flushed from the well and then samples of water shall be collected and submitted for microbiological analysis until three successive daily raw water samples are free of coliform organisms. The analysis of these samples must be conducted by a laboratory approved by the Texas Department of Health.

(ii) Appropriate facilities for treatment of the water shall be provided where a satisfactory microbiological record cannot be established after repeated disinfection. The

extent of water treatment required will be determined on the basis of geological data, well construction features, nearby sources of contamination and, perhaps, on the basis of quantitative microbiological analyses.

(G) A complete physical and chemical analysis of the water produced from a new well shall be made following a pump test on the well. A minimum four hour rest period is required between prior pumping and the actual pump test. [A complete physical and chemical analysis of the water produced from a new well shall be made after 36 hours of continuous pumping at the design withdrawal rate. Shorter pump test periods can be accepted for large capacity wells producing from areas of known groundwater production and quality so as to prevent wasting of water. Samples must be submitted to a certified laboratory for chemical analyses. Tentative approval may be given on the basis of tests performed by in-plant or private laboratories, but final acceptance by the commission shall be on the basis of results from the certified laboratory. Appropriate treatment shall be provided if the analyses reveal that the water from the well fails to meet the water quality criteria as prescribed by the drinking water standards. These criteria include turbidity, color and threshold odor limitations, and excessive hydrogen sulfide, carbon dioxide, or other constituents or minerals which make the water undesirable or unsuited for domestic use. Additional chemical and microbiological tests may be required after the executive director conducts a vulnerability assessment of the well.]

(i) Prior to collecting the samples, a pump test shall be conducted in accordance with the provisions of Section 5.1 of AWWA Standard A100. The well shall be pumped for 36 continuous hours at the design withdrawal rate. To reduce water usage, a test shorter than 36 hours may be accepted if the pumping period has been at least 24 hours and the pumping rate and pumping

level remain constant for at least four hours. A shorter pump test may also be accepted if the pumping rate remains constant for at least four hours and a horizontal straight-line trend is observed on a plot of water level versus a logarithm of time during pumping and recovery.

(ii) Following the pump test, samples shall be collected and submitted to a certified laboratory for chemical and microbiological analyses. Preliminary approval may be given on the basis of tests performed by in-plant or private laboratories, but final acceptance by the commission shall be on the basis of results from the certified laboratory. Appropriate treatment shall be provided if the analyses reveal that the water from the well fails to meet the water quality criteria as prescribed by the drinking water standards. These criteria include turbidity, color and threshold odor limitations, and excessive hydrogen sulfide, carbon dioxide, or other constituents or minerals which make the water undesirable or unsuitable for domestic use.

(iii) Additional chemical and microbiological tests may be required after the executive director conducts a vulnerability assessment of the well.

(H) Below ground-level pump rooms and pump pits will not be allowed in connection with water supply installations.

(I) The well site shall be fine graded so that the site is free from depressions, reverse grades, or areas too rough for proper ground maintenance so as to ensure that surface water will drain away from the well. In all cases, arrangements shall be made to convey well pump drainage, packing gland leakage, and floor drainage away from the wellhead. Suitable drain pipes located at the outer edge of the concrete floor shall be provided to collect this water and prevent its ponding or

collecting around the wellhead. This wastewater shall be disposed of in a manner that will not cause any nuisance from mosquito breeding or stagnation. Drains shall not be directly connected to storm or sanitary sewers.

(J) In all cases, a concrete sealing block extending at least three feet from the well casing in all directions, with a minimum thickness of six inches and sloped to drain away at not less than 0.25 inches per foot shall be provided around the wellhead.

(K) Wellheads and pump bases shall be sealed by a gasket or sealing compound and properly vented to prevent the possibility of contaminating the well water. A well casing vent shall be provided with an opening that is covered with 16-mesh or finer corrosion-resistant screen, facing downward, elevated and located so as to minimize the drawing of contaminants into the well. Wellheads and well vents shall be at least two feet above the highest known watermark or 100-year flood elevation, if available, or adequately protected from possible flood damage by levees.

(L) If a well blow-off line is provided, its discharge shall terminate in a downward direction and at a point which will not be submerged by flood waters.

(M) A suitable sampling cock shall be provided on the discharge pipe of each well pump prior to any treatment.

(N) Flow measuring devices shall be provided for each well to measure production yields and provide for the accumulation of water production data. These devices shall be located to facilitate daily reading.

(O) All completed well units shall be protected by intruder-resistant fences, the gates of which are provided with locks or shall be enclosed in locked, ventilated well houses to exclude possible contamination or damage to the facilities by trespassers. The gates or wellhouses shall be locked during periods of darkness and when the plant is unattended.

(P) An all-weather access road shall be provided to each well site.

(Q) If an air release device is provided on the discharge piping, it shall be installed in such a manner as to preclude the possibility of submergence or possible entrance of contaminants. In this respect, all openings to the atmosphere shall be covered with 16-mesh or finer, corrosion-resistant screening material or an acceptable equivalent.

(4) Pitless units may be desirable in areas subject to vandalism or extended periods of subfreezing weather.

(A) Pitless units shall be shop fabricated from the point of connection with the well casing to the unit cap or cover, be threaded or welded to the well casing, be of watertight construction throughout, and be of materials and weight at least equivalent and compatible to the casing. The units must have a field connection to the lateral discharge from the pitless unit of threaded, flanged, or mechanical joint connection.

(B) The design of the pitless unit shall make provisions for an access to disinfect the well, a properly designed casing vent, a cover at the upper terminal of the well that will

prevent the entrance of contamination, a sealed entrance connection for electrical cable, and at least one check valve within the well casing. The unit shall have an inside diameter as great as that of the well casing up to and including casing diameters of 12 inches.

(C) 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 will be that needed to connect a pitless unit to the well casing.

(D) With the exception of the fact that the well was constructed using a pitless unit, the well must otherwise meet all of the requirements of paragraph (3) of this subsection.

(d) Springs and other water sources.

(1) Springs and other similar sources of flowing artesian water shall be protected from potential contaminant sources in accordance with the requirements of subsection (c)(1) of this section.

(2) Before placing the spring or similar source into service, completion data similar to that required by subsection (c)(3)(A) of this section must be submitted to the executive director for review and approval to the Texas Commission on Environmental Quality, Water Supply Division, MC 153, P.O. Box 13087, Austin, Texas 78711-3987.

(3) Springs and similar sources shall be constructed in a manner which will preclude the entrance of surface water and debris.

(A) The site shall be fine graded so that it is free from depressions, reverse grades, or areas too rough for proper ground maintenance in order to ensure that surface water will drain away from the source.

(B) The spring or similar source shall be encased in an open-bottomed, watertight basin which intercepts the flowing water below the surface of the ground. The basin shall extend at least 18 inches above ground level. The top of the basin shall also be at least two feet above the highest known watermark or 100-year flood elevation, if available, or adequately protected from possible flood damage by levees.

(C) In all cases, a concrete sealing block shall be provided which extends at least three feet from the encasement in all directions. The sealing block shall be at least six inches thick and be sloped to drain away from the encasement at not less than 0.25 inches per foot.

(D) The top of the encasement shall be provided with a sloped, watertight roof which prevents the ponding of water and precludes the entrance of animals, insects, and other sources of contamination.

(E) The roof of the encasement shall be provided with a hatch that is not less than 30 inches in diameter. The hatch shall have a raised curbing at least four inches in height with a lockable cover that overlaps the curbing at least two inches in a downward direction. Where necessary, a gasket shall be used to make a positive seal when the hatch is closed. All hatches shall remain locked except during inspections and maintenance.

(F) The encasement shall be provided with a gooseneck vent or roof ventilator which is equipped with approved screens to prevent entry of animals, birds, insects, and heavy air contaminants. Screens shall be fabricated of corrosion-resistant material and shall be 16-mesh or finer. Screens shall be securely clamped in place with stainless or galvanized bands or wires.

(G) The encasement shall be provided with an overflow which is designed to prevent the entry of animals, birds, insects, and debris. The discharge opening of the overflow shall be above the surface of the ground and shall not be subject to submergence.

(4) Springs and similar sources must be provided with the appurtenances required by subsection (c)(3)(L) - (Q) of this section.

(e) Surface water sources and development.

(1) To determine the degree of pollution from all sources within the watershed, an evaluation shall be made of the surface water source in the area of diversion and its tributary streams. The area where surface water sources are diverted for drinking water use shall be evaluated and protected from sources of contamination.

(A) Where surface water sources are subject to continuous or intermittent contamination by municipal, agricultural, or industrial wastes and/or treated effluent, the adverse effects of the contamination on the quality of the raw water reaching the treatment plant shall be determined by site evaluations and laboratory procedures.

(B) The disposal of all liquid or solid wastes from any source on the watershed must be in conformity with applicable regulations and state statutes.

(C) Shore installations, marinas, boats and all habitations on the watershed shall be provided with satisfactory sewage disposal facilities. Septic tanks and soil absorption fields, tile or concrete sanitary sewers, sewer manholes, or other approved toilet facilities shall not be located in an area within 75 feet horizontally from the lake water surface at the uncontrolled spillway elevation of the lake or 75 feet horizontally from the 50-year flood elevation, whichever is lower.

(D) Disposal of wastes from boats or any other watercraft shall be in accordance with the Texas Water Code, §§321.1 - 321.18.

(E) Pesticides or herbicides which are used within the watershed shall be applied in strict accordance with the product label restrictions.

(F) Before approval of a new surface water source, the system shall provide the executive director with information regarding specific water quality parameters of the potential source water. These parameters are pH, total coliform, Eserichia coli, turbidity, alkalinity, hardness, bromide, total organic carbon, temperature, color, taste and odor, regulated volatile organic compounds, regulated synthetic organic compounds, regulated inorganic compounds, and possible sources of contamination. If data on the incidence of Giardia cysts and Cryptosporidium oocysts has been collected, the information shall be provided to the executive director. This data shall be provided to the executive director as part of the approval process for a new surface water source.

(2) Intakes shall be located and constructed in a manner which will secure raw water of the best quality available from the source.

(A) Intakes shall not be located in areas subject to excessive siltation or in areas subject to receiving immediate runoff from wooded sloughs or swamps.

(B) Raw water intakes shall not be located within 1,000 feet of boat launching ramps, marinas, docks, or floating fishing piers which are accessible by the public.

(C) A restricted zone of 200 feet radius from the raw water intake works shall be established and all recreational activities and trespassing shall be prohibited in this area. Regulations governing this zone shall be in the city ordinances or the rules and regulations promulgated by a water district or similar regulatory agency. The restricted zone shall be designated with signs recounting these restrictions. The signs shall be maintained in plain view of the public and shall be visible from all parts of the restricted area. In addition, special buoys may be required as deemed necessary by the executive director. Provisions shall be made for the strict enforcement of such ordinances or regulations.

(D) Commission staff shall make an on-site evaluation of any proposed raw water intake location. The evaluation must be requested prior to final design and must be supported by preliminary design drawings. Once the final intake location has been selected, the executive director shall be furnished with an original or legible copy of a United States Geological Survey 7.5-minute topographic quadrangle showing the accurate intake location.

(E) Intakes shall be located and constructed in a manner which will allow raw water to be taken from a variety of depths and which will permit withdrawal of water when reservoir levels are very low. Fixed level intakes are acceptable if water quality data is available to establish that the effect on raw water quality will be minimal.

(F) Water intake works shall be provided with screens or grates to minimize the amount of debris entering the plant.

(G) Intakes shall not be located within 500 feet of a sewage treatment plant or lands irrigated with sewage effluent.

(3) The raw water pump station shall be located in a well-drained area and shall be designed to remain in operation during flood events.

(4) An all weather road shall be provided to the raw water pump station.

(5) The raw water pump station and all appurtenances must be installed in a lockable building that is designed to prevent intruder access or enclosed by an intruder-resistant fence with lockable gates.

§290.42 Water Treatment

(a) Capacity and location.

(1) Based on current acceptable design standards, the total capacity of the public water system's treatment facilities must always be greater than its anticipated maximum daily demand.

(2) The water treatment plant and all pumping units shall be located in well-drained areas not subject to flooding and away from seepage areas or where the underground water table is near the surface.

(A) Water treatment plants shall not be located within 500 feet of a sewage treatment plant or lands irrigated with sewage effluent. A minimum distance of 150 feet must be maintained between any septic tank drainfield line and any underground treatment or storage unit. Any sanitary sewers located within 50 feet of any underground treatment or storage unit shall be constructed of ductile iron or polyvinyl chloride (PVC) pipe with a minimum pressure rating of 150 pounds per square inch (psi) and have watertight joints.

(B) Plant site selection shall also take into consideration the need for disposition of all plant wastes in accordance with all applicable regulations and state statutes, including both liquid and solid waste or by-product material from operation and/or maintenance.

(3) Each water treatment plant shall be located at a site that is accessible by an all-weather road.

(b) Groundwater.

(1) Disinfection facilities shall be provided for all groundwater supplies for the purpose of microbiological control and distribution protection and shall be in conformity with applicable disinfection requirements in subsection (e) of this section.

(2) Treatment facilities shall be provided for groundwater if the water does not meet the drinking water standards. The facilities provided shall be in conformance with established and proven methods.

(A) Filters provided for turbidity and microbiological quality control shall be preceded by coagulant addition and shall conform to the requirements of subsection (d)(10) of this section. Filtration rates for iron and manganese removal, regardless of the media or type of filter, shall be based on a maximum rate of five gallons per square foot per minute.

(B) The removal of iron and manganese may not be required if it can be demonstrated that these metals can be sequestered so that the discoloration problems they cause do not exist in the distribution system.

(C) All processes involving exposure of the water to atmospheric contamination shall provide for subsequent disinfection of the water ahead of ground storage tanks. Likewise, all exposure of water to atmospheric contamination shall be accomplished in a manner such that insects, birds, and other foreign materials will be excluded from the water. Aerators and all other such openings shall be screened with 16-mesh or finer corrosion-resistant screen.

(3) Any proposed change in the extent of water treatment required will be determined on the basis of geological data, well construction features, nearby sources of contamination, and on qualitative and quantitative microbiological and chemical analyses.

(4) Appropriate laboratory facilities shall be provided with equipment [for controls as well as] to check the effectiveness of disinfection, test the free ammonia level if chloramines are used, and monitor [or] any other treatment processes employed.

(5) All plant piping shall be constructed to minimize leakage.

(6) All groundwater systems shall provide sampling taps for raw water, treated water, and at a point representing water entering the distribution system at every entry point.

(7) Air release devices shall be installed in such a manner as to preclude the possibility of submergence or possible entrance of contaminants. In this respect, all openings to the atmosphere shall be covered with 16-mesh or finer corrosion-resistant screening material or an equivalent acceptable to the executive director.

(c) Springs and other water sources.

(1) Water obtained from springs, infiltration galleries, wells in fissured areas, wells in carbonate rock formations, or wells that do not penetrate an impermeable strata or any other source subject to surface or near surface contamination of recent origin shall be evaluated for the provision of

treatment facilities. Minimum treatment shall consist of coagulation with direct filtration and adequate disinfection. In all cases, the treatment process shall be designed to achieve at least a 2-log removal of *Cryptosporidium* oocysts, a 3-log removal or inactivation of *Giardia* cysts, and a 4-log removal or inactivation of viruses before the water is supplied to any consumer. The executive director may require additional levels of treatment in cases of poor source water quality.

(A) Filters provided for turbidity and microbiological quality control shall conform to the requirements of subsection (d)(11) of this section.

(B) All processes involving exposure of the water to atmospheric contamination shall provide for subsequent disinfection of the water ahead of ground storage tanks. Likewise, all exposure of water to atmospheric contamination shall be accomplished in a manner such that insects, birds, and other foreign materials will be excluded from the water. Aerators and all other such openings shall be screened with 16-mesh or finer corrosion-resistant screen.

(2) Any proposed change in the extent of water treatment required will be determined on the basis of geological data, well construction features, nearby sources of contamination, and qualitative and quantitative microbiological and chemical analyses.

(3) Appropriate laboratory facilities shall be provided with equipment to check [for controls as well as checking] the effectiveness of disinfection, test the free ammonia level if chloramines are used, and monitor [or] any other treatment processes employed.

(4) All plant piping shall be constructed to minimize leakage. No cross-connection or interconnection shall be permitted to exist between a conduit carrying potable water and another conduit carrying raw water or water in a prior stage of treatment.

(5) All systems using springs and other water sources shall provide sampling taps for raw water, treated water, and at a point representing water entering the distribution system at every entry point.

(6) Return of the decanted water or sludge to the treatment process shall be adequately controlled so that there will be a minimum of interference with the treatment process and shall conform to the applicable requirements of subsection (d)(3) of this section. Beginning July 1, 2004, systems that do not comply with the provisions of subsection (d)(3) of this section commit a treatment technique violation and must notify their customers in accordance with the requirements of §290.122(b) of this title (relating to Public Notice).

(7) Air release devices on treated waterlines shall be installed in such a manner as to preclude the possibility of submergence or possible entrance of contaminants. In this respect, all openings to the atmosphere shall be covered with 16-mesh or finer corrosion-resistant screening material or an equivalent acceptable to the executive director.

(d) Surface water.

(1) All water secured from surface sources shall be given complete treatment at a plant which provides facilities for pretreatment disinfection, taste and odor control, continuous coagulation, sedimentation, filtration, covered clearwell storage, and terminal disinfection of the water with chlorine or suitable chlorine compounds. In all cases, the treatment process shall be designed to achieve at least a 2-log removal of *Cryptosporidium* oocysts, a 3-log removal or inactivation of *Giardia* cysts, and a 4-log removal or inactivation of viruses before the water is supplied to any consumer. The executive director may require additional levels of treatment in cases of poor source water quality.

(2) All plant piping shall be constructed so as to be thoroughly tight against leakage. No cross-connection or interconnection shall be permitted to exist in a filtration plant between a conduit carrying filtered or post-chlorinated water and another conduit carrying raw water or water in any prior stage of treatment.

(A) Vacuum breakers must be provided on each hose bibb within the plant facility.

(B) No conduit or basin containing raw water or any water in a prior stage of treatment shall be located directly above, or be permitted to have a single common partition wall with another conduit or basin containing finished water.

(C) Make-up water supply lines to chemical feeder solution mixing chambers shall be provided with an air gap or other acceptable backflow prevention device.

(D) Filters shall be located so that common walls will not exist between them and aerators, mixing and sedimentation basins or clearwells. This rule is not strictly applicable, however, to partitions open to view and readily accessible for inspection and repair.

(E) Filter-to-waste connections, if included, shall be provided with an air gap connection to waste. Air gaps that do not meet the vertical separation distance specified in §290.38(1) are permissible with the approval of the executive director.

(F) Air release devices on treated waterlines shall be installed in such a manner as to preclude the possibility of submergence or possible entrance of contaminants. In this respect, all openings to the atmosphere shall be covered with 16-mesh or finer corrosion-resistant screening material or an equivalent acceptable to the executive director.

(3) Return of the decanted water or solids to the treatment process shall be adequately controlled so that there will be a minimum of interference with the treatment process. Beginning July 1, 2004, systems that do not comply with the provisions of this paragraph commit a treatment technique violation and must notify their customers in accordance with the requirements of §290.122(b) of this title.

(A) Unless the executive director has approved an alternate recycling location, spent backwash water and the liquids from sludge settling lagoons, spent backwash water tanks, sludge thickeners, and similar dewatering facilities shall be returned to the raw waterline upstream of the raw

water sample tap and coagulant feed point. The blended recycled liquids shall pass through all of the major unit processes at the plant.

(B) Recycle facilities shall be designed to minimize the magnitude and impact of hydraulic surges that occur during the recycling process.

(C) Solids produced by dewatering facilities such as sludge lagoons, sludge thickeners, centrifuges, mechanical presses, and similar devices shall not be returned to the treatment plant without the prior approval of the executive director.

(4) Reservoirs for pretreatment or selective quality control shall be provided where complete treatment facilities fail to operate satisfactorily at times of maximum turbidities or other abnormal raw water quality conditions exist. Recreational activities at such reservoirs shall be prohibited.

(5) Flow measuring devices shall be provided to measure the raw water supplied to the plant, the recycled decant water, the treated water used to backwash the filters, and the treated water discharged from the plant. Additional metering devices shall be provided as appropriate to monitor the flow rate through specific treatment processes. Metering devices shall be located to facilitate use and to assist in the determination of chemical dosages, the accumulation of water production data, and the operation of plant facilities.

(6) Chemical storage facilities shall comply with applicable requirements in subsection (f)(1) of this section.

(7) Chemical feed facilities shall comply with the applicable requirements in subsection (f)(2) of this section.

(8) Flash mixing equipment shall be provided.

(A) Plants with a design capacity greater than 3.0 million gallons per day must provide at least one hydraulic mixing unit or at least two sets of mechanical flash mixing equipment designed to operate in parallel. Public water systems with other surface water treatment plants, interconnections with other systems, or wells that can meet the system's average daily demand are exempt from the requirement for redundant mechanical flash mixing equipment.

(B) Flash mixing equipment shall have sufficient flexibility to ensure adequate dispersion and mixing of coagulants and other chemicals under varying raw water characteristics and raw water flow rates.

(9) Flocculation equipment shall be provided.

(A) Plants with a design capacity greater than 3.0 million gallons per day must provide at least two sets of flocculation equipment which are designed to operate in parallel. Public water systems with other surface water treatment plants, interconnections with other systems, or wells

that can meet the system's average daily demand are exempt from the requirement for redundant flocculation equipment.

(B) Flocculation facilities shall be designed to provide adequate time and mixing intensity to produce a settleable floc under varying raw water characteristics and raw water flow rates.

(i) Flocculation facilities for straight-flow and up-flow sedimentation basins shall provide a minimum theoretical detention time of at least 20 minutes when operated at their design capacity. Flocculation facilities constructed prior to October 1, 2000 are exempt from this requirement if the settled water turbidity of each sedimentation basin remains below 10.0 Nephelometric Turbidity Unit (NTU) and the treatment plant meets with turbidity requirements of §290.111 of this title (relating to Turbidity).

(ii) The mixing intensity in multiple-stage flocculators shall decrease as the coagulated water passes from one stage to the next.

(C) Coagulated water or water from flocculators shall flow to sedimentation basins in such a manner as to prevent destruction of floc. Piping, flumes, and troughs shall be designed to provide a flow velocity of 0.5 to 1.5 feet per second. Gates, ports, and valves shall be designed at a maximum flow velocity of 4.0 feet per second in the transfer of water between units.

(10) Clarification facilities shall be provided.

(A) Plants with a design capacity greater than 3.0 million gallons per day must provide at least two sedimentation basins or clarification units which are designed to operate in parallel. Public water systems with other surface water treatment plants, interconnections with other systems, or wells that can meet the system's average daily demand are exempt from the requirement for redundant sedimentation basins or clarification units.

(B) The inlet and outlet of clarification facilities shall be designed to prevent short-circuiting of flow or the destruction of floc.

(C) Clarification facilities shall be designed to remove flocculated particles effectively.

(i) When operated at their design capacity, basins for straight-flow or up-flow sedimentation of coagulated waters shall provide either a theoretical detention time of at least six hours in the flocculation and sedimentation chambers or a maximum surface overflow rate of 0.6 gallons per minute per square foot of surface area in the sedimentation chamber.

(ii) When operated at their design capacity, basins for straight-flow or up-flow sedimentation of softened waters shall provide either a theoretical detention time of at least 4.5 hours in the flocculation and sedimentation chambers or a maximum surface overflow rate of 1.0 gallons per minute per square foot of surface area in the sedimentation chamber.

(iii) When operated at their design capacity, sludge-blanket and solids-recirculation clarifiers shall provide either a theoretical detention time of at least two hours in the flocculation and sedimentation chambers or a maximum surface overflow rate of 1.0 gallons per minute per square foot in the settling chamber.

(iv) A side wall water depth of at least 12 feet shall be provided in clarification basins that are not equipped with mechanical sludge removal facilities.

(v) The effective length of a straight-flow sedimentation basin shall be at least twice its effective width.

(D) Clarification facilities shall be designed to prevent the accumulation of settled solids.

(i) At treatment plants with a single clarification basin, facilities shall be provided to drain the basin within six hours. In the event that the plant site topography is such that gravity draining cannot be realized, a permanently installed electric-powered pump station shall be provided to dewater the basin. Public water systems with other potable water sources that can meet the system's average daily demand are exempt from this requirement.

(ii) Facilities for sludge removal shall be provided by mechanical means or by hopper-bottomed basins with valves capable of complete draining of the units.

(11) Gravity or pressure type filters shall be provided.

(A) The use of pressure filters shall be limited to installations with a treatment capacity of less than 0.50 million gallons per day.

(B) Filtration facilities shall be designed to operate at filtration rates which assure effective filtration at all times.

(i) The design capacity of gravity rapid sand filters shall not exceed a maximum filtration rate of 2.0 gallons per square foot per minute. At the beginning of filter runs for declining rate filters, a maximum filtration rate of 3.0 gallons per square foot per minute is allowed.

(ii) Where high-rate gravity filters are used, the design capacity shall not exceed a maximum filtration rate of 5.0 gallons per square foot per minute. At the beginning of filter runs for declining rate filters, a maximum filtration rate of 6.5 gallons per square foot per minute is allowed.

(iii) The design capacity of pressure filters shall not exceed a maximum filtration rate of 2.0 gallons per square foot per minute with the largest filter off-line.

(iv) Except as provided in clause (vi) of this subparagraph, any surface water treatment plant that provides, or is being designed to provide, less than 7.5 million gallons per

day must be able to meet either the maximum daily demand or the minimum required 0.6 gallons per minute per connection, whichever is larger, with all filters on-line.

(v) Any surface water treatment plant that provides, or is being designed to provide, 7.5 million gallons per day or more must be able to meet either the maximum daily demand or the minimum required 0.6 gallons per minute per connection, whichever is larger, with the largest filter off-line.

(vi) Any surface water treatment plant that uses pressure filters must be able to meet either the maximum daily demand or the minimum required 0.6 gallons per minute per connection, whichever is larger, with the largest filter off-line.

(C) The depth and condition of the media and support material shall be sufficient to provide effective filtration.

(i) The filtering material shall conform to American Water Works Association (AWWA) standards and be free from clay, dirt, organic matter, and other impurities.

(ii) The grain size distribution of the filtering material shall be as prescribed by AWWA standards.

(iii) The depth of filter sand, anthracite, granular activated carbon, or other filtering materials shall be 24 inches or greater and provide an L/d ratio of at least 1,000.

(I) Rapid sand filters typically contain a minimum of eight inches of fine sand with an effective size of 0.35 to 0.45 millimeter (mm), eight inches of medium sand with an effective size of 0.45 to 0.55 mm, and eight inches of coarse sand with an effective size of 0.55 to 0.65 mm. The uniformity coefficient of each size range should not exceed 1.6.

(II) High-rate dual media filters typically contain a minimum of 12 inches of sand with an effective size of 0.45 to 0.55 mm and 24 inches of anthracite with an effective size of 0.9 to 1.1 mm. The uniformity coefficient of each material should not exceed 1.6.

(III) High-rate multi-media filters typically contain a minimum of three inches of garnet media with an effective size of 0.2 to 0.3 mm, nine inches of sand with an effective size of 0.5 to 0.6 mm, and 24 inches of anthracite with an effective size of 0.9 to 1.1 mm. The uniformity coefficient of each size range should not exceed 1.6.

(IV) High-rate mono-media anthracite or granular activated carbon filters typically contain a minimum of 48 inches of anthracite or granular activated carbon with an effective size of 1.0 to 1.2 mm. The uniformity coefficient of each size range should not exceed 1.6.

(iv) Under the filtering material, at least 12 inches of support gravel shall be placed varying in size from 1/16 inch to 2.5 inches. The gravel may be arranged in three to five layers such that each layer contains material about twice the size of the material above it. Other support material may be approved on an individual basis.

(D) The filter shall be provided with facilities to regulate the filtration rate.

(i) With the exception of declining rate filters, each filter unit shall be equipped with a manually adjustable rate-of-flow controller with rate-of-flow indication or flow control valves with indicators.

(ii) Each declining rate filter shall be equipped with a rate-of-flow limiting device or an adjustable flow control valve with a rate-of-flow indicator.

(iii) The effluent line of each filter installed after January 1, 1996, must be equipped with a slow opening valve or another means of automatically preventing flow surges when the filter begins operation.

(E) The filters shall be provided with facilities to monitor the performance of the filter. Monitoring devices shall be designed to provide the ability to measure and record turbidity as required by §290.111 of this title.

(i) Each filter shall be equipped with a sampling tap so that the effluent turbidity of the filter can be individually monitored.

(ii) Beginning January 1, 2005, each filter operated by a public water system that serves fewer than 10,000 people shall be equipped with an on-line turbidimeter and recorder which will allow the operator to measure and record the turbidity at 15-minute intervals. The executive

director may allow combined filter effluent monitoring in lieu of individual filter effluent monitoring under the following conditions:

(I) The public water system has only two filters that were installed prior to October 1, 2000 and were never equipped with individual on-line turbidimeters and recorders; and

(II) The plant is equipped with an on-line turbidimeter and recorder which will allow the operator to measure and record the turbidity level of the combined filter effluent at a location prior to clearwell storage at 15-minute intervals.

(iii) Each filter operated by a public water system that serves at least 10,000 people shall be equipped with an on-line turbidimeter and recorder which will allow the operator to measure and record the turbidity at 15-minute intervals.

(iv) Each filter installed after October 1, 2000 shall be equipped with an on-line turbidimeter and recorder which will allow the operator to determine the turbidity at 15-minute intervals.

(v) Each filter unit that is not equipped with an on-line turbidimeter and recorder shall be equipped with a device to indicate loss of head through the filter. In lieu of loss-of-head indicators, declining rate filter units may be equipped with rate-of-flow indicators.

(F) Filters shall be designed to ensure adequate cleaning during the backwash cycle.

(i) Only filtered water shall be used to backwash the filters. This water may be supplied by elevated wash water tanks, by the effluent of other filters, or by pumps which take suction from the clearwell and are provided for backwashing filters only. For installations having a treatment capacity no greater than 150,000 gallons per day, water for backwashing may be secured directly from the distribution system if proper controls and rate-of-flow limiters are provided.

(ii) The rate of filter backwashing shall be regulated by a rate-of-flow controller or flow control valve.

(iii) The rate of flow of backwash water shall not be less than 20 inches vertical rise per minute (12.5 gallons per minute per square foot) and usually not more than 35 inches vertical rise per minute (21.8 gallons per minute per square foot).

(iv) The backwash facilities shall be capable of expanding the filtering bed during the backwash cycle.

(I) For facilities equipped with air scour, the backwash facilities shall be capable of expanding the filtering bed at least 15% during the backwash cycle.

(II) For mixed-media filters without air scour, the backwash facilities shall be capable of expanding the filtering bed at least 25% during the backwash cycle.

(III) For mono-media sand filters without air scour, the backwash facilities shall be capable of expanding the filtering bed at least 40% during the backwash cycle.

(v) The filter freeboard in inches shall exceed the wash rate in inches of vertical rise per minute.

(vi) When used, surface filter wash systems shall be installed with an atmospheric vacuum breaker or a reduced pressure principle backflow assembly in the supply line. If an atmospheric vacuum breaker is used it shall be installed in a section of the supply line through which all the water passes and which is located above the overflow level of the filter.

(vii) Gravity filters installed after January 1, 1996 shall be equipped with air scour backwash or surface wash facilities.

(G) Each filter installed after October 1, 2000 shall be equipped with facilities that allow the filter to be completely drained without removing other filters from service.

(12) Pipe galleries shall provide ample working room, good lighting, and good drainage provided by sloping floors, gutters, and sumps. Adequate ventilation to prevent condensation and to provide humidity control is also required.

(13) The identification of influent, effluent, waste backwash, and chemical feed lines shall be accomplished by the use of labels or various colors of paint. Where labels are used, they shall be placed along the pipe at no greater than five-foot intervals. Color coding must be by solid color or banding. If bands are used, they shall be placed along the pipe at no greater than five-foot intervals.

(A) A plant that is built or repainted after October 1, 2000 must use the following color code. The color code to be used in labeling pipes is as follows:

Attached Graphic

(B) A plant that was repainted before October 1, 2000 may use an alternate color code. The alternate color code must provide clear visual distinction between process streams.

(C) The system must maintain clear, current documentation of its color code in a location easily accessed by all personnel.

(14) All surface water treatment plants shall provide sampling taps for raw, settled, individual filter effluent, and clearwell discharge. Additional sampling taps shall be provided as appropriate to monitor specific treatment processes.

(15) An adequately equipped laboratory shall be available locally so that daily microbiological and chemical tests can be conducted.

(A) For plants serving 25,000 persons or more, the local laboratory used to conduct the required daily microbiological analyses must be certified by the executive director to conduct coliform analyses.

(B) For plants serving populations of less than 25,000, the facilities for making microbiological tests may be omitted if the required microbiological samples can be submitted to a laboratory certified by the executive director on a timely basis.

(C) All surface water treatment plants shall be provided with equipment for making at least the following determinations:

(i) pH;

(ii) temperature;

(iii) disinfectant residual;

(iv) free ammonia levels if chloramines are used;

(v) [(iv)] alkalinity;

(vi) [(v)] turbidity;

(vii) [(vi)] jar tests for determining the optimum coagulant dose; and

(viii) [(vii)] other tests deemed necessary to monitor specific water quality problems or to evaluate specific water treatment processes.

(D) An amperometric titrator with platinum-platinum electrodes shall be provided at all surface water treatment plants that use chlorine dioxide.

(E) Each surface water treatment plant that uses sludge-blanket clarifiers shall be equipped with facilities to monitor the depth of the sludge blanket.

(F) Each surface water treatment plant that uses solids-recirculation clarifiers shall be equipped with facilities to monitor the solids concentration in the slurry.

(16) Each surface water treatment plant shall be provided with a computer and software for recording performance data, maintaining records, and submitting reports to the executive director. The executive director may allow a water system to locate the computer at a site other than the water treatment plant only if performance data can be reliably transmitted to the remote location on a real-time basis, the plant operator has access to the computer at all times, and performance data is readily accessible to agency staff during routine and special investigations.

(e) Disinfection.

(1) All water obtained from surface sources or groundwater sources that are under the direct influence of surface water must be disinfected in a manner consistent with the requirements of §290.110 of this title (relating to Disinfectant Residuals). Systems claiming viral inactivation credit for chloramines must achieve a free chlorine, chlorine dioxide, or ozone residual prior to the application of ammonia.

(2) All groundwater must be disinfected prior to distribution. The point of application must be ahead of the water storage tank(s) if storage is provided prior to distribution. Permission to use alternate disinfectant application points must be obtained in writing from the executive director.

(3) Disinfection equipment shall be selected and installed so that continuous and effective disinfection can be secured under all conditions.

(A) Disinfection equipment shall have a capacity at least 50% greater than the highest expected dosage to be applied at any time. It shall be capable of satisfactory operation under every prevailing hydraulic condition.

(B) Automatic proportioning of the disinfectant dosage to the flow rate of the water being treated shall be provided at plants where the treatment rate varies automatically, and at all plants where the treatment rate varies more than 50% above or below the average flow. Manual control shall be permissible at surface water treatment plants or plants treating groundwater under the direct influence of surface water only if an operator is always on hand to make adjustments promptly.

(C) All disinfecting equipment in surface water treatment plants shall include at least one functional standby unit of each capacity for ensuring uninterrupted operation. Common standby units are permissible but, generally, more than one standby unit must be provided because of the differences in feed rates or the physical state in which the disinfectants are being fed (solid, liquid, or gas).

(D) Facilities shall be provided for determining the amount of disinfectant used daily as well as the amount of disinfectant remaining for use.

(E) When used, solutions of calcium hypochlorite shall be prepared in a separate mixing tank and allowed to settle so that only a clear supernatant liquid is transferred to the hypochlorinator container.

(F) Provisions shall be made for both pretreatment disinfection and post-disinfection in all surface water treatment plants. Additional application points shall be installed if they are required to adequately control the quality of the treated water.

(G) The use of disinfectants other than chlorine or chloramines will be considered on a case-by-case basis under the exception guidelines of §290.39(l) of this title (relating to General Provisions).

(4) Systems that use chlorine gas must ensure that the risks associated with its use are limited as follows.

(A) When chlorine gas is used, a full-face self-contained breathing apparatus or supplied air respirator that meets Occupational Safety and Health Administration (OSHA) standards for construction and operation, and a small bottle of fresh ammonia solution (or approved equal) for testing for chlorine leakage shall be readily accessible outside the chlorinator room and immediately available to the operator in the event of an emergency.

(B) Housing for gas chlorination equipment and cylinders of chlorine shall be in separate buildings or separate rooms with impervious walls or partitions separating all mechanical and electrical equipment from the chlorine facilities. Housing shall be located above ground level as a measure of safety. Equipment and cylinders may be installed on the outside of the buildings when protected from adverse weather conditions and vandalism.

(C) Adequate ventilation, which includes both high level and floor level screened vents, shall be provided for all enclosures in which gas chlorine is being stored or fed. Enclosures containing more than one operating 150-pound cylinder of chlorine shall also provide forced air ventilation which includes: screened and louvered floor level and high level vents; a fan which is located at and draws air in through the top vent and discharges to the outside atmosphere through the floor level vent; and a fan switch located outside the enclosure. Alternately, systems may install negative pressure ventilation as long as the facilities also have gas containment and treatment as prescribed by the current Uniform Fire Code (UFC).

(5) Hypochlorination solution containers and pumps must be housed in a secure enclosure to protect them from adverse weather conditions and vandalism. The solution container top must be completely covered to prevent the entrance of dust, insects, and other contaminants.

(6) Where anhydrous ammonia feed equipment is utilized, it must be housed in a separate enclosure equipped with both high and low level ventilation to the outside atmosphere. The enclosure must be provided with forced air ventilation which includes: screened and louvered floor level and high level vents; a fan which is located at and draws air in through the floor vent and discharges through the top vent; and a fan switch located outside the enclosure. Alternately, systems may install negative pressure ventilation as long as the facilities also have gas containment and treatment as prescribed by the current UFC.

(f) Surface water treatment plant chemical storage and feed facilities.

(1) Chemical storage facilities shall be designed to ensure a reliable supply of chemicals to the feeders, minimize the possibility and impact of accidental spills, and facilitate good housekeeping.

(A) Bulk storage facilities at the plant shall be adequate to store at least a 15-day supply of all chemicals needed to comply with minimum treatment technique and maximum contaminant level (MCL) requirements. The capacity of these bulk storage facilities shall be based on the design capacity of the treatment plant. However, the executive director may require a larger stock of chemicals based on local resupply ability.

(B) Day tanks shall be provided to minimize the possibility of severely overfeeding liquid chemicals. Day tanks will not be required if adequate process control instrumentation and procedures are employed to prevent chemical overfeed incidents.

(C) Every chemical bulk storage facility and day tank shall have a label that identifies the facility's or tank's contents and a device that indicates the amount of chemical remaining in the facility or tank.

(D) Dry chemicals shall be stored off the floor in a dry room that is located above ground and protected against flooding or wetting from floors, walls, and ceilings.

(E) Bulk storage facilities and day tanks must be designed to minimize the possibility of leaks and spills.

(i) The materials used to construct bulk storage and day tanks must be compatible with the chemicals being stored and resistant to corrosion.

(ii) Except as provided in this clause, adequate containment facilities shall be provided for all liquid chemical storage tanks.

(I) Containment facilities for a single container or for multiple interconnected containers must be large enough to hold the maximum amount of chemical that can be

stored with a minimum freeboard of six vertical inches or to hold 110% of the total volume of the container(s), whichever is less.

(II) Common containment for multiple containers that are not interconnected must be large enough to hold the volume of the largest container with a minimum freeboard of six vertical inches or to hold 110% of the total volume of the container(s), whichever is less.

(III) The materials used to construct containment structures must be compatible with the chemicals stored in the tanks.

(IV) Incompatible chemicals shall not be stored within the same containment structure.

(V) No containment facilities are required for hypochlorite solution containers that have a capacity of 35 gallons or less.

(VI) On a site-specific basis, the executive director may approve the use of double-walled tanks in lieu of separate containment facilities.

(F) Chemical transfer pumps and control systems must be designed to minimize the possibility of leaks and spills.

(G) Piping, pumps, and valves used for chemical storage and transfer must be compatible with the chemical being fed.

(2) Chemical feed and metering facilities shall be designed so that chemicals shall be applied in a manner which will maximize reliability, facilitate maintenance, and ensure optimal finished water quality.

(A) Each chemical feeder that is needed to comply with a treatment technique or MCL requirement shall have a standby or reserve unit. Common standby feeders are permissible, but generally, more than one standby feeder must be provided due to the incompatibility of chemicals or the state in which they are being fed (solid, liquid, or gas).

(B) Chemical feed equipment shall be sized to provide proper dosage under all operating conditions.

(i) Devices designed for determining the chemical feed rate shall be provided for all chemical feeders.

(ii) The capacity of the chemical feeders shall be such that accurate control of the dosage can be achieved at the full range of feed rates expected to occur at the facility.

(iii) Chemical feeders shall be provided with tanks for chemical dissolution when applicable.

(C) Chemical feeders, valves, and piping must be compatible with the chemical being fed.

(D) Chemical feed systems shall be designed to minimize the possibility of leaks and spills and provide protection against backpressure and siphoning.

(E) If enclosed feed lines are used, they shall be designed and installed so as to prevent clogging and be easily maintained.

(F) Dry chemical feeders shall be located in a separate room that is provided with facilities for dust control.

(G) Coagulant feed systems shall be designed so that coagulants are applied to the water prior to or within the mixing basins or chambers so as to permit their complete mixing with the water.

(i) Coagulant feed points shall be located downstream of the raw water sampling tap.

(ii) Coagulants shall be applied continuously during treatment plant operation.

(H) Chlorine feed units, ammonia feed units, and storage facilities shall be separated by solid, sealed walls.

(I) Chemical application points shall be provided to achieve acceptable finished water quality, adequate taste and odor control, corrosion control, and disinfection.

(g) Other treatment processes. The adjustment of fluoride ion content, special treatment for iron and manganese reduction, special methods for taste and odor control, demineralization, corrosion control processes, and other proposals covering other treatment processes will be considered on an individual basis, in accordance with §290.39(l) of this title. Package-type treatment systems and their components shall be subject to all applicable design criteria in this section. Where innovative/alternate treatment systems are proposed, the licensed professional engineer must provide pilot test data or data collected at similar full-scale operations demonstrating that the system will produce water that meets the requirements of Subchapter F of this chapter (relating to Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems). Pilot test data must be representative of the actual operating conditions which can be expected over the course of the year. The executive director may require proof of a one-year manufacturer's performance warrantee or guarantee assuring that the plant will produce treated water which meets minimum state and federal standards for drinking water quality.

(h) Sanitary facilities for water works installations. Toilet and hand washing facilities provided in accordance with established standards of good public health engineering practices shall be available at all installations requiring frequent visits by operating personnel.

(i) Permits for waste discharges. Any discharge of wastewater and other plant wastes shall be in accordance with all applicable state and federal statutes and regulations. Permits for discharging wastes from water treatment processes shall be obtained from the commission, if necessary.

(j) Treatment chemicals and media. All chemicals and any additional or replacement process media used in treatment of water supplied by public water systems must conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 60 for direct additives and ANSI/NSF Standard 61 for indirect additives. Conformance with these standards must be obtained by certification of the product by an organization accredited by ANSI.

(k) Safety.

(1) Safety equipment for all chemicals used in water treatment shall meet applicable standards established by the OSHA or Texas Hazard Communication Act, Texas Health and Safety Code, Title 6, Chapter 502.

(2) Systems must comply with United States Environmental Protection Agency (EPA) requirements for Risk Management Plans.

(l) Plant operations manual. A thorough plant operations manual must be compiled and kept up-to-date for operator review and reference. This manual should be of sufficient detail to provide the operator with routine maintenance and repair procedures, with protocols to be utilized in the event of a

natural or man-made catastrophe, as well as provide telephone numbers of water system personnel, system officials, and local/state/federal agencies to be contacted in the event of an emergency.

(m) Security. Each water treatment plant and all appurtenances thereof shall be enclosed by an intruder-resistant fence. The gates shall be locked during periods of darkness and when the plant is unattended. A locked building in the fence line may satisfy this requirement or serve as a gate.

§290.43 Water Storage.

(a) Capacity. The minimum clearwell, storage tank, and pressure maintenance capacity shall be governed by the requirements in §290.45 of this title (relating to Minimum Water System Capacity Requirements).

(b) Location of clearwells, standpipes, and ground storage and elevated tanks.

(1) No public water supply elevated storage or ground storage tank shall be located within 500 feet of any municipal or industrial sewage treatment plant or any land which is spray irrigated with treated sewage effluent or sludge disposal.

(2) Insofar as possible, clearwells or treated water tanks shall not be located under any part of any buildings and, when possible, shall be constructed partially or wholly above ground.

(3) No storage tank or clearwell located below ground level is allowed within 50 feet of a sanitary sewer or septic tank. However, if the sanitary sewers are constructed of 150 pounds per square inch (psi) pressure-rated pipe with pressure-tested, watertight joints as used in water main construction, the minimum separation distance is ten feet.

(4) No storage tank or clearwell located below ground level is allowed within 150 feet of a septic tank soil absorption system.

(c) Design and construction of clearwells, standpipes, ground storage tanks, and elevated tanks. All facilities for potable water storage shall be covered and designed, fabricated, erected, tested, and disinfected in strict accordance with current American Water Works Association (AWWA) standards and shall be provided with the minimum number, size and type of roof vents, man ways, drains, sample connections, access ladders, overflows, liquid level indicators, and other appurtenances as specified in these rules. Bolted tanks shall be designed, fabricated, erected, and tested in strict accordance with current AWWA Standard D103. No [The roof of all tanks shall be designed and erected so that no water ponds at any point on the roof and, in addition, no] area of the roof shall have a slope of less than 0.75 inch per foot. In addition, the tank shall be designed and erected so that water does not pond on the roof. Temporary ponding will be allowed if the accumulated water is no more than 0.25 inch deep, the ponding does not compromise the integrity of the exterior coating or surface of the tank, and there is no crack or opening within or downstream of the slight depression.

(1) Roof vents shall be gooseneck or roof ventilator and be designed by the engineer based on the maximum outflow from the tank. Vents shall be installed in strict accordance with current

AWWA standards and shall be equipped with approved screens to prevent entry of animals, birds, insects and heavy air contaminants. Screens shall be fabricated of corrosion-resistant material and shall be 16-mesh or finer. Screens shall be securely clamped in place with stainless or galvanized bands or wires and shall be designed to withstand winds of not less than tank design criteria (unless specified otherwise by the engineer).

(2) All roof openings shall be designed in accordance with current AWWA standards. If an alternate 30 inch diameter access opening is not provided in a storage tank, the primary roof access opening shall not be less than 30 inches in diameter. Other roof openings required only for ventilating purposes during cleaning, repairing or painting operations shall be not less than 24 inches in diameter or as specified by the licensed professional engineer. An existing tank without a 30-inch in diameter access opening must be modified to meet this requirement when major repair or maintenance is performed on the tank. Each access opening shall have a raised curbing at least four inches in height with a lockable cover that overlaps the curbing at least two inches in a downward direction. Where necessary, a gasket shall be used to make a positive seal when the hatch is closed. All hatches shall remain locked except during inspections and maintenance.

(3) Overflows shall be designed in strict accordance with current AWWA standards [and shall terminate with a gravity-hinged and weighted cover. The cover shall fit tightly with no gap over 1/16 inch. If the overflow terminates at any point other than the ground level, it shall be located near enough and at a position accessible from a ladder or the balcony for inspection purposes]. The overflow(s) shall be sized to handle the maximum possible fill rate without exceeding the capacity of the overflow(s). The discharge opening of the overflow(s) shall be above the surface of the ground and

shall not be subject to submergence. The discharge opening shall be covered with a gravity-hinged and weighted cover, an elastomeric duckbill valve, or other device to prevent the entrance of insects and other nuisances. When the tank is not overflowing, the cover shall close automatically and fit tightly with no gap over 1/16 inch. If the overflow terminates at any point other than the ground level, the discharge cover shall be accessible from a ladder or a balcony for inspection purposes.

(4) All clearwells and water storage tanks shall have a liquid level indicator located at the tank site. The indicator can be a float with a moving target, an ultrasonic level indicator, or a pressure gauge calibrated in feet of water. If an elevated tank or standpipe has a float with moving target indicator, it must also have a pressure indicator located at ground level. Pressure gauges must not be less than three inches in diameter and calibrated at not more than two-foot intervals. Remote reading gauges at the owner's treatment plant or pumping station will not eliminate the requirement for a gauge at the tank site unless the tank is located at the plant or station.

(5) Inlet and outlet connections shall be located so as to prevent short-circuiting or stagnation of water. Clearwells used for disinfectant contact time shall be appropriately baffled.

(6) Clearwells and potable water storage tanks shall be thoroughly tight against leakage, shall be located above the groundwater table, and shall have no walls in common with any other plant units containing water in the process of treatment. All associated appurtenances including valves, pipes, and fittings shall be tight against leakage.

(7) Each clearwell or potable water storage tank shall be provided with a means of removing accumulated silt and deposits at all low points in the bottom of the tank. Drains shall not be connected to any waste or sewage disposal system and shall be constructed so that they are not a potential agent in the contamination of the stored water.

(8) All clearwells, ground storage tanks, standpipes, and elevated tanks shall be painted, disinfected, and maintained in strict accordance with current AWWA standards. However, no temporary coatings, wax grease coatings, or coating materials containing lead will be allowed. No other coatings will be allowed which are not approved for use (as a contact surface with potable water) by the EPA, National Sanitation Foundation (NSF), or United States Food and Drug Administration (FDA). All newly installed coatings must conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 and must be certified by an organization accredited by ANSI.

(9) No tanks or containers shall be used to store potable water that have previously been used for any non-potable purpose. Where a used tank is proposed for use, a letter from the previous owner or owners must be submitted to the Commission which states the use of the tank.

(10) Access manways in the riser pipe, shell area, access tube, bowl area or any other location opening directly into the water compartment shall be located in strict accordance with current AWWA standards. These openings shall not be less than 24 inches in diameter. However, in the case of a riser pipe or access tube of 36 inches in diameter or smaller, the access manway may be 18 inches times 24 inches with the vertical dimension not less than 24 inches. The primary access manway in the

lower ring or section of a ground storage tank shall be not less than 30 inches in diameter. Where necessary, for any access manway which allows direct access to the water compartment, a gasket shall be used to make a positive seal when the access manway is closed.

(d) Design and construction of pressure (hydropneumatic) tanks. All hydropneumatic tanks must be located wholly above grade and must be of steel construction with welded seams except as provided in paragraph (8) of this subsection.

(1) Metal thickness for pressure tanks shall be sufficient to withstand the highest expected working pressures with a four to one factor of safety. Tanks of 1,000 gallons capacity or larger must meet the standards of the American Society of Mechanical Engineers (ASME) Section VIII, Division 1 Codes and Construction Regulations and must have an access port for periodic inspections. An ASME name plate must be permanently attached to those tanks. Tanks installed before July 1, 1988, are exempt from the ASME coding requirement, but all new installations must meet this regulation. Exempt tanks may [can] be relocated within a system but may not [cannot] be relocated to another system. A non-community system with a well that discharges directly to a pressure tank is exempt from the four to one factor of safety requirement if they comply with the requirements of subparagraphs (A) - (C).

(A) The pressure tank has a capacity of less than 1,000 gallons.

(B) The manufacturer's test pressure for the pressure tank is at least two times greater than the maximum discharge pressure of the well pump.

(C) The pressure tank is not connected to a distribution system served by a service pump station.

(2) All pressure tanks shall be provided with a pressure release device and an easily readable pressure gauge.

(3) Facilities shall be provided for maintaining the air-water-volume at the design water level and working pressure. Air injection lines must be equipped with filters or other devices to prevent compressor lubricants and other contaminants from entering the pressure tank. A device to readily determine air-water-volume must be provided for all tanks greater than 1,000 gallon capacity. Galvanized tanks which are not provided with the necessary fittings and which were installed before July 1, 1988 shall be exempt from this requirement.

(4) Protective paint or coating shall be applied to the inside portion of any pressure tank. The coating shall be as specified in subsection (c)(8) of this section.

(5) No pressure tank that has been used to store any material other than potable water may be used in a public water system. A letter from the previous owner or owners must be provided as specified in subsection (c)(9) of this section.

(6) Pressure tank installations should be equipped with slow closing valves and time delay pump controls to eliminate water hammer and reduce the chance of tank failure.

(7) All associated appurtenances including valves, pipes and fittings connected to pressure tanks shall be thoroughly tight against leakage.

(8) Where seamless fiberglass tanks are utilized, they shall not exceed 300 gallons in capacity.

(9) No more than three pressure tanks shall be installed at any one site without the prior approval of the executive director.

(e) Facility security. All potable water storage tanks and pressure maintenance facilities must be installed in a lockable building that is designed to prevent intruder access or enclosed by an intruder-resistant fence with lockable gates. Pedestal-type elevated storage tanks with lockable doors and without external ladders are exempt from this requirement. The gates and doors must be kept locked whenever the facility is unattended.

(f) Service pumps. Service pump installations taking suction from storage tanks shall provide automatic low water level cutoff devices to prevent damage to the pumps. The service pump circuitry shall also resume pumping automatically once the minimum water level is reached in the tank.

§290.44 Water Distribution.

(a) Design and standards. All potable water distribution systems including pump stations, mains, and both ground and elevated storage tanks, shall be designed, installed, and constructed in accordance with current American Water Works Association (AWWA) standards with reference to materials to be used and construction procedures to be followed. In the absence of AWWA standards, commission review may be based upon the standards of the American Society for Testing and Materials (ASTM), commercial, and other recognized standards utilized by licensed professional engineers.

(1) All newly installed pipes and related products must conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 and must be certified by an organization accredited by ANSI.

(2) All plastic pipe and related products installed prior to January 1, 2006, for use in public water systems shall conform to ANSI/NSF Standard 14 and have been certified by an organization accredited by ANSI, [must also] bear the National Sanitation Foundation Seal of Approval (NSF-pw) and have an ASTM design pressure rating of at least 150 psi or a standard dimension ratio (SDR) of 26 or less.

(3) All plastic pipe and related products installed after December 31, 2005, for use in public water systems shall conform to ANSI/NSF Standard 14, have been certified by an organization accredited by ANSI, and bear the National Sanitation Foundation Seal of Approval (NSF-pw). In lieu of NSF-pw, plastic pipes and related products shall conform to the conditions in paragraph (1) **and** shall conform to Underwriters Laboratories (UL) Standard 1285 and have been certified by an organization accredited by UL. The selected plastic pipe shall be designed for all site specific operating parameters

such as surge pressures, water velocities, and water temperatures that will be encountered. At a minimum, the plastic pipe must meet one of the criteria listed in subparagraphs (A) - (D) of this paragraph.

(A) For AWWA C900 PVC and C905 PVC, the selected AWWA DR shall be 18 or less.

(B) For AWWA C901 HDPE and C906 HDPE, the selected AWWA DR shall be 11 or less.

(C) For ASTM 2241PVC, the selected ASTM SDR shall be 21 or less.

(D) For other types of plastic pipes and related products, or other operating conditions that allow thinner walled plastic piping and related products, supporting documentation for the design basis, including calculations and site specific operating parameters, shall be submitted with the engineering plans and specifications and approved in writing by the executive director.

(4) [(3)] No pipe that [which] has been used for any purpose other than the conveyance of drinking water shall be accepted or relocated for use in any public drinking water supply.

(5) [(4)] Water transmission and distribution lines must be installed in accordance with the manufacturer's instructions. However, the top of the waterline must be located below the frost line and in no case shall the top of the waterline be less than 24 inches below ground surface.

(6) [(5)] The hydrostatic leakage rate shall not exceed the amount allowed or recommended by AWWA formulas.

(b) Lead ban. The following provisions apply to the use of lead in plumbing.

(1) The use of pipes and pipe fittings that contain more than 8.0% lead or solders and flux that contains more than 0.2% lead is prohibited in the following circumstances:

(A) for installation or repair of any public water supply; and

(B) for installation or repair of any plumbing in a residential or nonresidential facility providing water for human consumption and connected to a public drinking water supply system.

(2) This requirement will be waived for lead joints that are necessary for repairs to cast iron pipe.

(c) Minimum waterline sizes. The minimum waterline sizes are for domestic flows only and do not consider fire flows. Larger pipe sizes shall be used when the licensed professional engineer deems it necessary. It should be noted that the required sizes are based strictly on the number of customers to be served and not on the distances between connections or differences in elevation or the type of pipe. No new waterline under two inches in diameter will be allowed to be installed in a public

water system distribution system. These minimum line sizes do not apply to individual customer service lines.

Attached Graphic

(d) Minimum pressure requirement. The system must be designed to maintain a minimum pressure of 35 psi at all points within the distribution network at flow rates of at least 1.5 gallons per minute per connection. When the system is intended to provide fire fighting capability, it must also be designed to maintain a minimum pressure of 20 psi under combined fire and drinking water flow conditions.

(1) Air release devices shall be installed in the distribution system at all points where topography or other factors may create air locks in the lines. Air release devices shall be installed in such a manner as to preclude the possibility of submergence or possible entrance of contaminants. In this respect, all openings to the atmosphere shall be covered with 16-mesh or finer, corrosion-resistant screening material or an acceptable equivalent.

(2) When service is to be provided to more than one pressure plane or when distribution system conditions and demands are such that low pressures develop, the method of providing increased pressure shall be by means of booster pumps taking suction from storage tanks. If an exception to this requirement is desired, the designing engineer must furnish for the executive director's review all planning material for booster pumps taking suction from other than a storage tank. The planning material must contain a full description of the supply to the point of suction, maximum

demands on this part of the system, location of pressure recorders, safety controls, and other pertinent information. Where booster pumps are installed to take suction directly from the distribution system, a minimum residual pressure of 20 psi must be maintained on the suction line at all times. Such installations must be equipped with automatic pressure cut-off devices so that the pumping units become inoperative at a suction pressure of less than 20 psi. In addition, a continuous pressure recording device may be required at a predetermined suspected critical pressure point on the suction line in order to record the hydraulic conditions in the line at all times. If such a record indicates critical minimum pressures (less than 20 psi), adequate storage facilities must be installed with the booster pumps taking suction from the storage facility. Fire pumps used to maintain pressure on automatic sprinkler systems only for fire protection purposes are not considered as in-line booster pumps.

(3) Service connections that require booster pumps taking suction from the public water system lines must be equipped with automatic pressure cut-off devices so that the pumping units become inoperative at a suction pressure of less than 20 psi. Where these types of installations are necessary, the preferred method of pressure maintenance consists of an air gapped connection with a storage tank and subsequent repressurization facilities.

(4) Each community public water system shall provide accurate metering devices at each residential, commercial, or industrial service connection for the accumulation of water usage data. A water system that furnishes the services or commodity only to itself or its employees when that service or commodity is not resold to or used by others is exempt from this requirement.

(5) The system shall be provided with sufficient valves and blowoffs so that necessary repairs can be made without undue interruption of service over any considerable area and for flushing the system when required. The engineering report shall establish criteria for this design.

(6) The system shall be designed to afford effective circulation of water with a minimum of dead ends. All dead-end mains shall be provided with acceptable flush valves and discharge piping. All dead-end lines less than two inches in diameter will not require flush valves if they end at a customer service. Where dead ends are necessary as a stage in the growth of the system, they shall be located and arranged to ultimately connect the ends to provide circulation.

(e) Location of waterlines. The following rules apply to installations of waterlines, wastewater mains or laterals, and other conveyances/appurtenances identified as potential sources of contamination. Furthermore, all ratings specified shall be defined by ASTM or AWWA standards unless stated otherwise. New mains, service lines, or laterals are those that are installed where no main, service line, or lateral previously existed, or where existing mains, service lines, or laterals are replaced with pipes of different size or material.

(1) When new potable water distribution lines are constructed, they shall be installed no closer than nine feet in all directions to wastewater collection facilities. All separation distances shall be measured from the outside surface of each of the respective pieces.

(2) Potable water distribution lines and wastewater mains or laterals that form parallel utility lines shall be installed in separate trenches.

(3) No physical connection shall be made between a drinking water supply and a sewer line. Any appurtenance shall be designed and constructed so as to prevent any possibility of sewage entering the drinking water system.

(4) Where the nine-foot separation distance cannot be achieved, the following criteria shall apply.

(A) New waterline installation - parallel lines.

(i) Where a new potable waterline parallels an existing, non-pressure or pressure rated wastewater main or lateral and the licensed professional engineer licensed in the State of Texas is able to determine that the existing wastewater main or lateral is not leaking, the new potable waterline shall be located at least two feet above the existing wastewater main or lateral, measured vertically, and at least four feet away, measured horizontally, from the existing wastewater main or lateral. Every effort shall be exerted not to disturb the bedding and backfill of the existing wastewater main or lateral.

(ii) Where a new potable waterline parallels an existing pressure rated wastewater main or lateral and it cannot be determined by the licensed professional engineer if the existing line is leaking, the existing wastewater main or lateral shall be replaced with at least 150 psi pressure rated pipe. The new potable waterline shall be located at least two feet above the new wastewater line, measured vertically, and at least four feet away, measured horizontally, from the replaced wastewater main or lateral.

(iii) Where a new potable waterline parallels a new wastewater main, the wastewater main or lateral shall be constructed of at least 150 psi pressure rated pipe. The new potable waterline shall be located at least two feet above the wastewater main or lateral, measured vertically, and at least four feet away, measured horizontally, from the wastewater main or lateral.

(B) New waterline installation - crossing lines.

(i) Where a new potable waterline crosses an existing, non-pressure rated wastewater main or lateral, one segment of the waterline pipe shall be centered over the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. The potable waterline shall be at least two feet above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. If the existing wastewater main or lateral is disturbed or shows signs of leaking, it shall be replaced for at least nine feet in both directions (18 feet total) with at least 150 psi pressure rated pipe.

(ii) Where a new potable waterline crosses an existing, pressure rated wastewater main or lateral, one segment of the waterline pipe shall be centered over the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. The potable waterline shall be at least six inches above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. If the existing wastewater main or lateral

shows signs of leaking, it shall be replaced for at least nine feet in both directions (18 feet total) with at least 150 psi pressure rated pipe.

(iii) Where a new potable waterline crosses a new, non-pressure rated wastewater main or lateral and the standard pipe segment length of the wastewater main or lateral is at least 18 feet, one segment of the waterline pipe shall be centered over the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. The potable waterline shall be at least two feet above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. The wastewater pipe shall have a minimum pipe stiffness of 115 psi at 5.0% deflection. The wastewater main or lateral shall be embedded in cement stabilized sand (see clause (vi) of this subparagraph) for the total length of one pipe segment plus 12 inches beyond the joint on each end.

(iv) Where a new potable waterline crosses a new, non-pressure rated wastewater main or lateral and a standard length of the wastewater pipe is less than 18 feet in length, the potable water pipe segment shall be centered over the wastewater line. The materials and method of installation shall conform with one of the following options.

(I) Within nine feet horizontally of either side of the waterline, the wastewater pipe and joints shall be constructed with pipe material having a minimum pressure rating of at least 150 psi. An absolute minimum vertical separation distance of two feet shall be provided. The wastewater main or lateral shall be located below the waterline.

(II) All sections of wastewater main or lateral within nine feet horizontally of the waterline shall be encased in an 18-foot (or longer) section of pipe. Flexible encasing pipe shall have a minimum pipe stiffness of 115 psi at 5.0% deflection. The encasing pipe shall be centered on the waterline and shall be at least two nominal pipe diameters larger than the wastewater main or lateral. The space around the carrier pipe shall be supported at five-foot (or less) intervals with spacers or be filled to the springline with washed sand. Each end of the casing shall be sealed with watertight non-shrink cement grout or a manufactured watertight seal. An absolute minimum separation distance of six inches between the encasement pipe and the waterline shall be provided. The wastewater line shall be located below the waterline.

(III) When a new waterline crosses under a wastewater main or lateral, the waterline shall be encased as described for wastewater mains or laterals in subclause (II) of this clause or constructed of ductile iron or steel pipe with mechanical or welded joints as appropriate. An absolute minimum separation distance of one foot between the waterline and the wastewater main or lateral shall be provided. Both the waterline and wastewater main or lateral must pass a pressure and leakage test as specified in AWWA C600 standards.

(v) Where a new potable waterline crosses a new, pressure rated wastewater main or lateral, one segment of the waterline pipe shall be centered over the wastewater line such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the center line of the wastewater main or lateral. The potable waterline shall be at least six inches above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. The wastewater pipe shall have a minimum pressure rating of at least

150 psi. The wastewater main or lateral shall be embedded in cement stabilized sand (see clause (vi) of this subparagraph) for the total length of one pipe segment plus 12 inches beyond the joint on each end.

(vi) Where cement stabilized sand bedding is required, the cement stabilized sand shall have a minimum of 10% cement per cubic yard of cement stabilized sand mixture, based on loose dry weight volume (at least 2.5 bags of cement per cubic yard of mixture). The cement stabilized sand bedding shall be a minimum of six inches above and four inches below the wastewater main or lateral. The use of brown coloring in cement stabilized sand for wastewater main or lateral bedding is recommended for the identification of pressure rated wastewater mains during future construction.

(5) Waterline and wastewater main or lateral manhole or cleanout separation. The separation distance from a potable waterline to a wastewater main or lateral manhole or cleanout shall be a minimum of nine feet. Where the nine-foot separation distance cannot be achieved, the potable waterline shall be encased in a joint of at least 150 psi pressure class pipe at least 18 feet long and two nominal sizes larger than the new conveyance. The space around the carrier pipe shall be supported at five-foot intervals with spacers or be filled to the springline with washed sand. The encasement pipe shall be centered on the crossing and both ends sealed with cement grout or manufactured sealant.

(6) Location of fire hydrants. Fire hydrants shall not be installed within nine feet vertically or horizontally of any wastewater main, wastewater lateral, or wastewater service line regardless of construction.

(7) Location of potable or raw water supply or suction lines. Suction mains to pumping equipment shall not cross wastewater mains, wastewater laterals, or wastewater service lines. Raw water supply lines shall not be installed within five feet of any tile or concrete wastewater main, wastewater lateral, or wastewater service line.

(8) Proximity of septic tank drainfields. Waterlines shall not be installed closer than ten feet to septic tank drainfields.

(f) Sanitary precautions and disinfection. Sanitary precautions, flushing, disinfection procedures, and microbiological sampling as prescribed in AWWA standards for disinfecting water mains shall be followed in laying waterlines.

(1) Pipe shall not be laid in water or placed where it can be flooded with water or sewage during its storage or installation.

(2) Special precautions must be taken when waterlines are laid under any flowing or intermittent stream or semipermanent body of water such as marsh, bay, or estuary. In these cases, the water main shall be installed in a separate watertight pipe encasement and valves must be provided on each side of the crossing with facilities to allow the underwater portion of the system to be isolated and tested to determine that there are no leaks in the underwater line. Alternately, and with the permission of the executive director, the watertight pipe encasement may be omitted.

(3) New mains shall be thoroughly disinfected in accordance with AWWA Standard C651 and then flushed and sampled before being placed in service. Samples shall be collected for microbiological analysis to check the effectiveness of the disinfection procedure. Sampling shall be repeated if contamination persists. A minimum of one sample for each 1,000 feet of completed waterline will be required or at the next available sampling point beyond 1,000 feet as designated by the design engineer.

(g) Interconnections.

(1) Each proposal for a direct connection between public drinking water systems under separate administrative authority will be considered on an individual basis.

(A) Documents covering the responsibility for sanitary control shall accompany the submitted planning material.

(B) Each water supply shall be of a safe, potable quality.

(2) Where an interconnection between systems is proposed to provide a second source of supply for one or both systems, the system being utilized as a second source of supply must be capable of supplying a minimum of 0.35 gallons per minute per connection for the total number of connections in the combined distribution systems.

(h) Backflow, siphonage.

(1) No water connection from any public drinking water supply system shall be allowed to any residence or establishment where an actual or potential contamination hazard exists unless the public water facilities are protected from contamination.

(A) At any residence or establishment where an actual or potential contamination hazard exists, additional protection shall be required at the meter in the form of an air gap or backflow prevention assembly. The type of backflow prevention assembly required shall be determined by the specific potential hazard identified in §290.47(i) of this title (relating to Appendices).

(B) At any residence or establishment where an actual or potential contamination hazard exists and an adequate internal cross-connection control program is in effect, backflow protection at the water service entrance or meter is not required.

(i) An adequate internal cross-connection control program shall include the installation of appropriate backflow prevention assemblies at each cross-connection. The backflow assembly selected shall be in accordance with §290.47(j) of this title (relating to Appendices).

(ii) [(i)] An adequate internal cross-connection control program shall include an annual inspection and testing by a certified backflow prevention assembly tester on all backflow prevention assemblies used for health hazard protection.

(iii) [(ii)] Copies of all such inspection and test reports must be obtained and kept on file by the water purveyor.

(iv) [(iii)] It will be the responsibility of the water purveyor to ensure that these requirements are met.

(2) No water connection from any public drinking water supply system shall be connected to any condensing, cooling, or industrial process or any other system of nonpotable usage over which the public water supply system officials do not have sanitary control, unless the said connection is made in accordance with the requirements of paragraph (1) of this subsection. Water from such systems cannot be returned to the potable water supply.

(3) Overhead bulk water dispensing stations must be provided with an air gap between the filling outlet hose and the receiving tank to protect against back siphonage and cross-contamination.

(4) All backflow prevention assemblies that are required according to this section and associated tables [table] located in §290.47(i) and §290.47(j) of this title shall be installed in accordance with the American Water Works Association Recommended Practice for Backflow Prevention and Cross-Connection Control (Manual M14) or The University of Southern California's Manual of Cross-Connection Control. The required backflow prevention assemblies shall be tested upon installation by a recognized backflow prevention assembly tester and certified to be operating within specifications. Backflow prevention assemblies that [which] are installed to provide protection against health hazards must also be tested and certified to be operating within specifications at least annually by a recognized backflow prevention assembly tester.

(A) Recognized backflow prevention assembly testers shall [have completed an executive director approved course on cross-connection control and backflow prevention assembly testing, pass an examination administered by the executive director, and hold current professional certification as a backflow prevention assembly tester] hold a current Backflow Prevention Assembly Tester license issued by the commission in accordance with the provisions of Chapter 30 of this title (relating to Occupational Licensing).

(i) Backflow prevention assembly testers are qualified to test and repair assemblies on any domestic, commercial, industrial, or irrigation service.

(ii) Backflow prevention assembly testers shall comply with requirements established by the State Fire Marshall's Office when testing or repairing backflow prevention assemblies on firelines. [Backflow prevention assembly testers may test and repair assemblies on firelines only if they are permanently employed by an Approved Fireline Contractor. The State Fire Marshall's office requires that any person performing maintenance on firelines must be employed by an Approved Fireline Contractor.]

(B) Gauges used in the testing of backflow prevention assemblies shall be tested for accuracy annually in accordance with the University of Southern California's Manual of Cross-Connection Control or the American Water Works Association Recommended Practice for Backflow Prevention and Cross-Connection Control (Manual M14). Public water systems shall require testers to include test gauge serial numbers on "Test and Maintenance" report forms and ensure testers have gauges tested for accuracy.

(C) A test report must be completed by the recognized backflow prevention assembly tester for each assembly tested. The signed and dated original must be submitted to the public water supplier for recordkeeping purposes. Any form which varies from the format specified in Appendix F located in §290.47(f) of this title must be approved by the executive director prior to being placed in use.

(5) The use of a backflow prevention assembly at the service connection shall be considered as additional backflow protection and shall not negate the use of backflow protection on internal hazards as outlined and enforced by local plumbing codes.

(6) At any residence or establishment where there is no actual or potential contamination hazard, a backflow prevention assembly is not required.

(i) Water hauling. When drinking water is distributed by tank truck or trailer, it must be accomplished in the following manner.

(1) Water shall be obtained from an approved source.

(2) The equipment used to haul the water must be approved by the executive director and must be constructed as follows.

(A) The tank truck or trailer shall be used for transporting drinking water only and shall be labeled "Drinking Water." Tanks which have been used previously for purposes other than transporting potable liquids shall not be used for hauling drinking water.

(B) The tank shall be watertight and of an approved material which is impervious and easily cleaned and disinfected. Any paint or coating and any plastic or fiberglass materials used as contact surfaces must be approved by the United States Environmental Protection Agency, the United States Food and Drug Administration, or the NSF. Effective January 1, 1993, any newly installed surfaces shall conform to ANSI/NSF Standard 61 and must be certified by an organization accredited by ANSI.

(C) The tank shall have a manhole and a manhole cover which overlaps the raised manhole opening by a minimum of two inches and terminates in a downward direction. The cover shall fit firmly on the manhole opening and shall be kept locked.

(D) The tank shall have a vent which is faced downward and located to minimize the possibility of drawing contaminants into the stored water. The vent must be screened with 16-mesh or finer corrosion-resistant material.

(E) Connections for filling and emptying the tank shall be properly protected to prevent the possible entrance of contamination. These openings must be provided with caps and keeper chains.

(F) A drain shall be provided which will completely empty the tank for cleaning or repairs.

(G) When a pump is used to transfer the water from the tank, the pump shall be permanently mounted with a permanent connection to the tank. The discharge side of the pump shall be properly protected between uses by a protective cap and keeper chain.

(H) Hoses used for the transfer of drinking water to and from the tank shall be used only for that purpose and labeled for drinking water only. The hoses shall conform to ANSI/NSF Standard 61 and must be certified by an entity recognized by the commission. Hoses and related appurtenances must be cleaned and disinfected on a regular basis during prolonged use or before start-up during intermittent use. Hoses must be properly stored between uses and must be provided with caps and keeper chains or have the ends connected together.

(I) The tank shall be disinfected monthly and at any time that contamination is suspected.

(J) At least one sample per month from each tank shall be collected and submitted for microbiological analysis to one of the commission's approved laboratories for each month of operation.

(K) A minimum free chlorine residual of 0.5 mg/L or, if chloramines are used as the primary disinfectant, a chloramine residual of 1.0 mg/L (measured as total chlorine) shall be

maintained in the water being hauled. Chlorine or chlorine containing compounds may be added on a "batch" basis to maintain the required residual.

(L) Operational records detailing the amount of water hauled, purchases, microbiological sampling results, chlorine residual readings, dates of disinfection, and source of water shall be maintained.

§290.45 Minimum Water System Capacity Requirements.

(a) General provisions.

(1) The requirements contained in this section are to be used in evaluating both the total capacities for public water systems and the capacities at individual pump stations and pressure planes which serve portions of the system that are hydraulically separated from, or incapable of being served by, other pump stations or pressure planes. The capacities specified in this section are minimum requirements only.

(2) The executive director will require additional supply, storage, service pumping, and pressure maintenance facilities if a normal operating pressure of 35 pounds per square inch (psi) cannot be maintained throughout the system, or if the system's maximum daily demand exceeds its total production and treatment capacity. The executive director will also require additional capacities if the system is unable to maintain a minimum pressure of 20 psi during fire fighting, line flushing, and other unusual conditions.

(3) The executive director may establish additional capacity requirements for a public water system using the method of calculation described in subsection (g)(2) of this section if there are repeated customer complaints regarding inadequate pressure or if the executive director receives a request for a capacity evaluation from customers of the system.

(4) Throughout this section, total storage capacity does not include pressure tank capacity.

(5) The executive director may exclude the capacity of facilities that have been inoperative for the past 120 days and will not be returned to an operative condition within the next 30 days when determining compliance with the requirements of this section.

(6) The capacity of the treatment facilities shall not be less than the required raw water or groundwater production rate or the anticipated maximum daily demand of the system.

(b) Community water systems.

(1) Groundwater supplies must meet the following requirements.

(A) If fewer than 50 connections without ground storage, the system must meet the following requirements:

(i) a well capacity of 1.5 gallons per minute (gpm) per connection; and

(ii) a pressure tank capacity of 50 gallons per connection.

(B) If fewer than 50 connections with ground storage, the system must meet the following requirements:

(i) a well capacity of 0.6 gpm per connection;

(ii) a total storage capacity of 200 gallons per connection;

(iii) two or more service pumps having a total capacity of 2.0 gpm per connection; and

(iv) a pressure tank capacity of 20 gallons per connection.

(C) For 50 to 250 connections, the system must meet the following requirements:

(i) a well capacity of 0.6 gpm per connection;

(ii) a total storage capacity of 200 gallons per connection;

(iii) two or more pumps having a total capacity of 2.0 gpm per connection at each pump station or pressure plane. For systems which provide an elevated storage

capacity of 200 gallons per connection, two service pumps with a minimum combined capacity of 0.6 gpm per connection are required at each pump station or pressure plane. If only wells and elevated storage are provided, service pumps are not required; and

(iv) an elevated storage capacity of 100 gallons per connection or a pressure tank capacity of 20 gallons per connection.

(D) For more than 250 connections, the system must meet the following requirements:

(i) two or more wells having a total capacity of 0.6 gpm per connection. Where an interconnection is provided with another acceptable water system capable of supplying at least 0.35 gpm for each connection in the combined system under emergency conditions, an additional well will not be required as long as the 0.6 gpm per connection requirement is met for each system on an individual basis. Each water system must still meet the storage and pressure maintenance requirements on an individual basis unless the interconnection is permanently open. In this case, the systems' capacities will be rated as though a single system existed;

(ii) a total storage capacity of 200 gallons per connection;

(iii) two or more pumps that have a total capacity of 2.0 gpm per connection or that have a total capacity of at least 1,000 gpm and the ability to meet peak hourly demands with the largest pump out of service, whichever is less, at each pump station or pressure

plane. For systems which provide an elevated storage capacity of 200 gallons per connection, two service pumps with a minimum combined capacity of 0.6 gpm per connection are required at each pump station or pressure plane. If only wells and elevated storage are provided, service pumps are not required;

(iv) an elevated storage capacity of 100 gallons per connection or a pressure tank capacity of 20 gallons per connection. If pressure tanks are used, a maximum capacity of 30,000 gallons is sufficient for up to 2,500 connections. An elevated storage capacity of 100 gallons per connection is required for systems with more than 2,500 connections. Alternate methods of pressure maintenance may be proposed and will be approved if the criteria contained in subsection (g)(5) of this section are met; and

(v) emergency power for systems which serve more than 250 connections and do not meet the elevated storage requirement. Sufficient emergency power must be provided to deliver a minimum of 0.35 gpm per connection to the distribution system in the event of the loss of normal power supply. Alternately, an emergency interconnection can be provided with another public water system that has emergency power and is able to supply at least 0.35 gpm for each connection in the combined system. Emergency power facilities in systems serving 1,000 connections or greater must be serviced and maintained in accordance with level 2 maintenance requirements contained in the current National Fire Protection Association (NFPA) 110 standards. Although not required, compliance with NFPA 110 standards is highly recommended for systems serving less than 1,000 connections. Logs of all emergency power use and maintenance must be maintained and kept on

file for a period of not less than three years. These records must be made available, upon request, for executive director review.

(E) Mobile home parks with a density of eight or more units per acre and apartment complexes which supply fewer than 100 connections without ground storage must meet the following requirements:

(i) a well capacity of 1.0 gpm per connection; and

(ii) a pressure tank capacity of 50 gallons per connection with a maximum of 2,500 gallons required.

(F) Mobile home parks and apartment complexes which supply 100 connections or greater, or fewer than 100 connections and utilize ground storage must meet the following requirements:

(i) a well capacity of 0.6 gpm per connection. Systems with 250 or more connections must have either two wells or an approved interconnection which is capable of supplying at least 0.35 gpm for each connection in the combined system;

(ii) a total storage of 200 gallons per connection;

(iii) at least two service pumps with a total capacity of 2.0 gpm per connection; and

(iv) a pressure tank capacity of 20 gallons per connection.

(2) Surface water supplies must meet the following requirements:

(A) a raw water pump capacity of 0.6 gpm per connection with the largest pump out of service;

(B) a treatment plant capacity of 0.6 gpm per connection under normal rated design flow;

(C) transfer pumps (where applicable) with a capacity of 0.6 gpm per connection with the largest pump out of service;

(D) a covered clearwell storage capacity at the treatment plant of 50 gallons per connection or, for systems serving more than 250 connections, 5.0% of daily plant capacity;

(E) a total storage capacity of 200 gallons per connection;

(F) a service pump capacity that provides each pump station or pressure plane with two or more pumps that have a total capacity of 2.0 gpm per connection or that have a total

capacity of at least 1,000 gpm and the ability to meet peak hourly demands with the largest pump out of service, whichever is less. For systems which provide an elevated storage capacity of 200 gallons per connection, two service pumps with a minimum combined capacity of 0.6 gpm per connection are required at each pump station or pressure plane;

(G) an elevated storage capacity of 100 gallons per connection or a pressure tank capacity of 20 gallons per connection. If pressure tanks are used, a maximum capacity of 30,000 gallons is sufficient for systems of up to 2,500 connections. An elevated storage capacity of 100 gallons per connection is required for systems with more than 2,500 connections. Alternate methods of pressure maintenance may be proposed and will be approved if the criteria contained in subsection (g)(5) of this section are met; and

(H) emergency power for systems which serve more than 250 connections and do not meet the elevated storage requirement. Sufficient emergency power must be provided to deliver a minimum of 0.35 gpm per connection to the distribution system in the event of the loss of normal power supply. Alternately, an emergency interconnection can be provided with another public water system that has emergency power and is able to supply at least 0.35 gpm for each connection in the combined system. Emergency power facilities in systems serving 1,000 connections or greater must be serviced and maintained in accordance with level 2 maintenance requirements contained in the current NFPA 110 standards. Although not required, compliance with NFPA 110 standards is highly recommended for systems serving less than 1,000 connections. Logs of all emergency power use and maintenance must be maintained and kept on file for a period of not less than three years. These records must be made available, upon request, for executive director review.

(c) Noncommunity water systems serving transient accommodation units. The following water capacity requirements apply to noncommunity water systems serving accommodation units such as hotel rooms, motel rooms, travel trailer spaces, campsites, and similar accommodations.

(1) Groundwater supplies must meet the following requirements.

(A) If fewer than 100 accommodation units without ground storage, the system must meet the following requirements:

(i) a well capacity of 1.0 gpm per unit; and

(ii) a pressure tank capacity of ten gallons per unit with a minimum of 220 gallons.

(B) For systems serving fewer than 100 accommodation units with ground storage or serving 100 or more accommodation units, the system must meet the following requirements:

(i) a well capacity of 0.6 gpm per unit;

(ii) a ground storage capacity of 35 [gpm] gallons per unit;

(iii) two or more service pumps which have a total capacity of 1.0 gpm per unit; and

(iv) a pressure tank capacity of ten gallons per unit.

(2) Surface water supplies, regardless of size, must meet the following requirements:

(A) a raw water pump capacity of 0.6 gpm per unit with the largest pump out of service;

(B) a treatment plant capacity of 0.6 gpm per unit;

(C) a transfer pump capacity (where applicable) of 0.6 gpm per unit with the largest pump out of service;

(D) a ground storage capacity of 35 gallons per unit with a minimum of 1,000 gallons as clearwell capacity;

(E) two or more service pumps with a total capacity of 1.0 gpm per unit; and

(F) a pressure tank capacity of ten gallons per unit with a minimum requirement of 220 gallons.

(d) Noncommunity water systems serving other than transient accommodation units.

(1) The following table is applicable to paragraphs (2) and (3) of this subsection and shall be used to determine the maximum daily demand for the various types of facilities listed.

Attached Graphic

(2) Groundwater supplies must meet the following requirements.

(A) Subject to the requirements of subparagraph (B) of this paragraph, if fewer than 300 persons per day are served, the system must meet the following requirements:

(i) a well capacity which meets or exceeds the maximum daily demand of the system during the hours of operation; and

(ii) a minimum pressure tank capacity of 220 gallons with additional capacity, if necessary, based on a sanitary survey conducted by the executive director.

(B) Systems that [which] serve 300 or more persons per day, or that [which] serve fewer than 300 persons per day and provide ground storage, must meet the following requirements:

(i) a well capacity which meets or exceeds the maximum daily demand;

(ii) a ground storage capacity which is equal to 50% of the maximum daily demand;

(iii) if the maximum daily demand is less than 15 gpm, at least one service pump with a capacity of three times the maximum daily demand;

(iv) if the maximum daily demand is 15 gpm or more, at least two service pumps with a total capacity of three times the maximum daily demand; and

(v) a minimum pressure tank capacity of 220 gallons with additional capacity, if necessary, based on a sanitary survey conducted by the executive director.

(3) Each surface water supply or groundwater supply that is under the direct influence of surface water, regardless of size, must meet the following requirements:

(A) a raw water pump capacity which meets or exceeds the maximum daily demand of the system with the largest pump out of service;

(B) a treatment plant capacity which meets or exceeds the system's maximum daily demand;

(C) a transfer pump capacity (where applicable) sufficient to meet the maximum daily demand with the largest pump out of service;

(D) a clearwell capacity which is equal to 50% of the maximum daily demand;

(E) two or more service pumps with a total capacity of three times the maximum daily demand; and

(F) a minimum pressure tank capacity of 220 gallons with additional capacity, if necessary, based on a sanitary survey conducted by the executive director.

(e) Water wholesalers. The following additional requirements apply to systems which supply wholesale treated water to other public water supplies.

(1) All wholesalers must provide enough production, treatment, and service pumping capacity to meet or exceed the combined maximum daily commitments specified in their various contractual obligations.

(2) For wholesale water suppliers, minimum water system capacity requirements shall be determined by calculating the requirements based upon the number of retail customer service connections of that wholesale water supplier, if any, and adding that amount to the maximum amount of water obligated or pledged under all wholesale contracts.

(3) Emergency power is required for each portion of the system which supplies more than 250 connections under direct pressure and does not provide an elevated storage capacity of at least 100 gallons per connection. If emergency power is required, it must be sufficient to deliver 20% of the minimum required service pump capacity in the event of the loss of normal power supply. When the wholesaler provides water through an air gap into the purchaser's storage facilities it will be the

purchaser's responsibility to meet all minimum water system capacity requirements including emergency power.

(f) Purchased water systems. The following requirements apply only to systems which purchase treated water to meet all or part of their production, storage, service pump, or pressure maintenance capacity requirements.

(1) The water purchase contract must be available to the executive director in order that production, storage, service pump, or pressure maintenance capacity may be properly evaluated. For purposes of this section, a contract may be defined as a signed written document of specific terms agreeable to the water purchaser and the water wholesaler, or in its absence, a memorandum or letter of understanding between the water purchaser and the water wholesaler.

(2) The contract shall authorize the purchase of enough water to meet the monthly or annual needs of the purchaser.

(3) The contract shall also establish the maximum rate at which water may be drafted on a daily and hourly basis. In the absence of specific maximum daily or maximum hourly rates in the contract, a uniform purchase rate for the contract period will be used.

(4) The maximum authorized daily purchase rate specified in the contract, or a uniform purchase rate in the absence of a specified daily purchase rate, plus the actual production capacity of the system must be at least 0.6 gpm per connection.

(5) For systems which purchase water under direct pressure, the maximum hourly purchase authorized by the contract plus the actual service pump capacity of the system must be at least 2.0 gpm per connection or provide at least 1,000 gpm and be able to meet peak hourly demands, whichever is less.

(6) The purchaser is responsible for meeting all production requirements. If additional capacity to meet increased demands cannot be attained from the wholesaler through a new or amended contract, additional capacity must be obtained from water purchase contracts with other entities, new wells, or surface water treatment facilities. However, if the water purchase contract prohibits the purchaser from securing water from sources other than the wholesaler, the wholesaler is responsible for meeting all production requirements.

(7) All other minimum capacity requirements specified in this section shall apply.

(g) Alternative capacity requirements. Public water systems may request approval to meet alternative capacity requirements in lieu of the minimum capacity requirements specified in this section. Any water system requesting to use an alternative capacity requirement must demonstrate to the satisfaction of the executive director that approving the request will not compromise the public health or result in a degradation of service or water quality. Alternative capacity requirements are unavailable for groundwater systems serving fewer than 50 connections without total storage as specified in subsection (b)(1) of this section or for noncommunity water systems as specified in subsections (c) and (d) of this section.

(1) Alternative capacity requirements for public water systems may be granted upon request to and approval by the executive director. The request to use an alternative capacity requirement must include:

(A) a detailed inventory of the major production, pressurization, and storage facilities utilized by the system;

(B) records kept by the water system that document the daily production of the system. The period reviewed shall not be less than three years. The applicant may not use a calculated peak daily demand;

(C) data acquired during the last drought period in the region, if required by the executive director;

(D) the actual number of active connections for each month during the three years of production data;

(E) description of any unusual demands on the system such as fire flows or major main breaks that will invalidate unusual peak demands experienced in the study period;

(F) any other relevant data needed to determine that the proposed alternative capacity requirement will provide at least 35 psi in the public water system except during line repair or during fire fighting when it cannot be less than 20 psi; and

(G) a copy of all data relied upon for making the proposed determination.

(2) Alternative capacity requirements for existing public water systems must be based upon the maximum daily demand for the system, unless the request is submitted by a licensed professional engineer in accordance with the requirements of paragraph (3) of this subsection. The maximum daily demand must be determined based upon the daily usage data contained in monthly operating reports for the system during a 36 consecutive month period. The 36 consecutive month period must end within 90 days of the date of submission to ensure the data is as current as possible.

(A) Maximum daily demand is the greatest number of gallons, including groundwater, surface water, and purchased water delivered by the system during any single day during the review period. Maximum daily demand excludes unusual demands on the system such as fire flows or major main breaks.

(B) For the purpose of calculating alternative capacity requirements, an equivalency ratio must be established. This equivalency ratio must be calculated by multiplying the maximum daily demand, expressed in gpm per connection, by a fixed safety factor and dividing the result by 0.6 gpm per connection. The safety factor shall be 1.15 unless it is documented that the existing system capacity is adequate for the next five years. In this case, the safety factor may be reduced to 1.05. The conditions in §291.93(3) of this title (relating to Adequacy of Water Utility Service) concerning the 85% rule shall continue to apply to public water systems that are also retail public utilities.

(C) To calculate the alternative capacity requirements, the equivalency ratio must be multiplied by the appropriate minimum capacity requirements specified in subsection (b) of this section. Standard rounding methods are used to round calculated alternative production capacity requirement values to the nearest one-hundredth.

(D) For public water systems who wholesale all or a portion of their treated water to other public water systems, other considerations must be taken into account for calculating the equivalency ratio and alternative capacity requirements. The following calculated alternative capacity requirements will apply only to the wholesalers and not to purchasers.

(i) The wholesaler equivalency ratio must be calculated by multiplying the maximum daily demand (expressed in millions of gallons per day) by one of the safety factors listed below in subclause (I) and (II) of this clause. This result must be divided by the combined sum of a wholesaler's contractual peak daily draft rate obligations, plus 0.6 gpm per connection multiplied by the wholesaler's number of retail service connections (expressed in millions of gallons per day).

(I) If any written wholesale contractual obligations will expire in the next five years or the projected population growth for any purchaser is greater than 0% for the next five years, a safety factor of 1.15 must be used.

(II) If none of the written wholesale contractual obligations will expire in the next five years or the projected population growth for all purchasers is 0% or less for the next five years, a safety factor of 1.05 must be used.

(ii) A wholesaler's alternative production capacity requirement is calculated by multiplying the wholesaler's equivalency ratio by the sum of the wholesaler's contractual peak daily draft rate obligations plus the wholesaler's equivalency ratio multiplied by 0.6 gpm per connection times the wholesaler's number of retail service connections (expressed in millions of gallons per day).

(iii) For wholesalers treating surface water or groundwater under the influence of surface water, sufficient raw water and internal transfer pump capacities must be provided to meet the alternative production capacity requirement with the largest pump out of service.

(iv) For wholesalers treating surface water or groundwater under the influence of surface water, the alternative clearwell capacity requirement must be equal to, or greater than, the larger of the following three capacities (expressed in millions of gallons):

(I) 0.05 multiplied by the new alternative production capacity requirement;

(II) the minimum capacity to meet CT requirements for inactivation of pathogens; and,

(III) the minimum capacity necessary to maintain a continuous and adequate suction head for the potable water transfer and high service pumps during plant production and peak hour demands.

(v) The new combined alternative potable water transfer pump capacity requirement will depend on whether the interconnections between the wholesaler and purchasers are to a ground storage tank with an air separation distance between the inlet and overflow, or through direct pressure to a purchaser's distribution. The alternative potable water transfer pump capacity requirement shall be equal to, or greater than, the sum of each interconnection's calculated alternative potable water transfer pump capacity requirement using the methods listed below. The new alternative potable water transfer pump capacity requirement must be met with the largest pump out of service.

(I) When a wholesale interconnection is to a ground storage tank, the specific alternative potable water transfer pump capacity requirement will be equal to the wholesaler's equivalency ratio multiplied by the maximum daily draft rate specified in the contractual obligation.

(II) When a wholesale interconnection is by direct pressure to a purchaser's distribution, the specific alternative potable water transfer pump capacity requirement will be equal to the wholesaler's equivalency ratio multiplied by the maximum hourly draft rate specified in the contractual obligation.

(III) When a wholesale interconnection is by direct pressure to a purchaser's distribution and the contractual obligation does not specify a maximum hourly draft rate, the maximum daily draft rate specified in the contractual obligation multiplied by the equivalency ratio will also be multiplied by 1.25 when the required elevated storage capacity for the purchaser is met or by 1.85 when the required elevated storage capacity for the purchaser is not met.

(vi) When a wholesaler has its own retail service connections, the new alternative capacity requirements for each pressure plane will be calculated by multiplying the wholesaler's equivalency ratio by the commission's minimum capacity requirements specified in subsection (b) of this section. The alternative capacity requirements for the retail service connections are in addition to the calculated alternative capacity requirements for the wholesale connections.

(3) Alternative capacity requirements which are proposed and submitted by licensed professional engineers for review are subject to the following additional requirements.

(A) A signed and sealed statement by the licensed professional engineer must be provided which certifies that the proposed alternative capacity requirements have been determined in accordance with the requirements of this subsection.

(B) If the system is new or at least 36 consecutive months of data is not available, maximum daily demand may be based upon at least 36 consecutive months of data from a comparable public water system. A licensed professional engineer must certify that the data from another public water system is comparable based on consideration of the following factors: prevailing land use patterns (rural versus urban); number of connections; density of service populations; fire flow obligations; and socio-economic, climatic, geographic, and topographic considerations as well as other factors as may be relevant. The comparable public water system shall not exhibit any of the conditions listed in paragraph (6)(A) of this subsection.

(4) The executive director shall consider requests for alternative capacity requirements in accordance with the following requirements.

(A) For those requests submitted under the seal of a licensed professional engineer, the executive director must mail written acceptance or denial of the proposed alternative capacity requirements to the public water system within 90 days from the date of submission. If the executive director fails to mail written notification within 90 days, the alternative capacity requirements submitted by a licensed professional engineer automatically become the alternative capacity requirements for the public water system.

(B) If the executive director denies the request:

(i) the executive director shall mail written notice to the public water system identifying the specific reason or reasons for denial and allow 45 days for the public water system to respond to the reason(s) for denial;

(ii) the denial is final if no response from the public water system is received within 45 days of the written notice being mailed; and

(iii) the executive director must mail a final written approval or denial within 60 days from the receipt of any response timely submitted by the public water system.

(5) Although elevated storage is the preferred method of pressure maintenance for systems of over 2,500 connections, it is recognized that local conditions may dictate the use of alternate methods utilizing hydropneumatic tanks and on-site emergency power equipment. Alternative capacity requirements to the elevated storage requirements may be obtained based on request to and approval by the executive director. Special conditions apply to systems qualifying for an elevated storage alternative capacity requirement.

(A) The system must submit documentation sufficient to assure that the alternate method of pressure maintenance is capable of providing a safe and uninterrupted supply of water under pressure to the distribution system during all demand conditions.

(i) A signed and sealed statement by a licensed professional engineer must be provided which certifies that the pressure maintenance facilities are sized, designed, and capable of providing a minimum pressure of at least 35 psi at all points within the distribution network at flow rates of 1.5 gpm per connection or greater. In addition, the engineer must certify that the emergency power facilities are capable of providing the greater of the average daily demand or 0.35 gpm per connection while maintaining distribution pressures of at least 35 psi, and that emergency power facilities powering production and treatment facilities are capable of supplying at least 0.35 gpm per connection to storage.

(ii) The system's licensed professional engineer must conduct a hydraulic analysis of the system under peak conditions. This must include an analysis of the time lag between the loss of the normal power supply and the commencement of emergency power as well as the

minimum pressure that will be maintained within the distribution system during this time lag. In no case shall this minimum pressure within the distribution system be less than 20 psi. The results of this analysis must be submitted to the executive director for review.

(iii) For existing systems, the system's licensed professional engineer must provide continuous pressure chart recordings of distribution pressures maintained during past power failures, if available. The period reviewed shall not be less than three years.

(B) Emergency power facilities must be maintained and provided with necessary appurtenances to assure immediate and dependable operation in case of normal power interruption.

(i) The facilities must be serviced and maintained in accordance with level 2 maintenance requirements contained in the current NFPA 110 standards and the manufacturers' recommendations.

(ii) The switching gear must be capable of bringing the emergency power generating equipment on-line during a power interruption such that the pressure in the distribution network does not fall below 20 psi at any time.

(iii) The minimum on-site fuel storage capacity shall be determined by the fuel demand of the emergency power facilities and the frequency of fuel delivery. An amount of

fuel equal to that required to operate the facilities under-load for a period of at least eight hours must always be maintained on site.

(iv) Residential rated mufflers or other means of effective noise suppression must be provided on each emergency power motor.

(C) Battery-powered or uninterrupted power supply pressure monitors and chart recorders which are configured to activate immediately upon loss of normal power must be provided for pressure maintenance facilities. These records must be kept for a minimum of three years and made available for review by the executive director. Records must include chart recordings of all power interruptions including interruptions due to periodic emergency power under-load testing and maintenance.

(D) An emergency response plan must be submitted detailing procedures to be followed and individuals to be contacted in the event of loss of normal power supply.

(6) Any alternative capacity requirement granted under this subsection is subject to review and revocation or revision by the executive director. If permission to use an alternative capacity requirement is revoked, the public water system must meet the applicable minimum capacity requirements of this section.

(A) The following conditions, if attributable to the alternative capacity requirements, may constitute grounds for revocation or revision of established alternative capacity requirements or for denial of new requests, if the condition occurred within the last 36 months:

(i) documented pressure below 35 psi at any time not related to line repair, except during fire fighting when it cannot be less than 20 psi;

(ii) water outages due to high water usage;

(iii) mandatory water rationing due to high customer demand or overtaxed water production or supply facilities;

(iv) failure to meet a minimum capacity requirement or an established alternative capacity requirement;

(v) changes in water supply conditions or usage patterns which create a potential threat to public health; or

(vi) any other condition where the executive director finds that the alternative capacity requirement has compromised the public health or resulted in a degradation of service or water quality.

(B) If the executive director finds any of the conditions specified in subparagraph (A) of this paragraph, the process for revocation or revision of an alternative capacity requirement shall be as follows, unless the executive director finds that failure of the service or other threat to public health and safety is imminent under subparagraph (C) of this paragraph.

(i) The executive director must mail the public drinking water system written notice of the executive director's intent to revoke or revise an alternative capacity requirement identifying the specific reason(s) for the proposed action.

(ii) The public water system has 30 days from the date the written notice is mailed to respond to the proposed action.

(iii) The public water system has 30 days from the date the written notice is mailed to request a meeting with the agency's public drinking water program personnel to review the proposal. If requested, such a meeting must occur within 45 days of the date the written notice is mailed.

(iv) After considering any response from or after any requested meeting with the public drinking water system, the executive director must mail written notification to the public drinking water system of the executive director's final decision to continue, revoke, or revise an alternative capacity requirement identifying the specific reason(s) for the decision.

(C) If the executive director finds that failure of the service or other threat to public health and safety is imminent, the executive director may issue written notification of the executive director's final decision to revoke or revise an alternative capacity requirement at any time.

§290.46 Minimum Acceptable Operating Practices for Public Drinking Water Systems.

(a) General. When a public drinking water supply system is to be established, plans shall be submitted to the executive director for review and approval prior to the construction of the system. All public water systems are to be constructed in conformance with the requirements of this subchapter and maintained and operated in accordance with the following minimum acceptable operating practices. Owners and operators shall allow entry to members of the commission and employees and agents of the commission onto any public or private property at any reasonable time for the purpose of inspecting and investigating conditions relating to public water systems in the state. Members, employees, or agents acting under this authority shall observe the establishment's rules and regulations concerning safety, internal security, and fire protection, and if the property has management in residence, shall notify management or the person then in charge of his presence and shall exhibit proper credentials.

(b) Microbiological. Submission of samples for microbiological analysis shall be as required by Subchapter F of this chapter (relating to Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems). Microbiological samples may be required by the executive director for monitoring purposes in addition to the routine samples required by the drinking water standards. These samples shall be submitted to a certified laboratory. (A list of the certified laboratories can be obtained by contacting the executive director).

(c) Chemical. Samples for chemical analysis shall be submitted as directed by the executive director.

(d) Disinfectant residuals and monitoring. Disinfection equipment must be properly operated to prevent chemical overfeeds, and a [A] disinfectant residual must be continuously maintained during the treatment process and throughout the distribution system.

(1) Disinfection equipment shall be operated and monitored in a manner that will assure compliance with the requirements of §290.110 of this title (relating to Disinfectant Residuals).

(2) The disinfection equipment shall be operated to maintain the following minimum disinfectant residuals in each finished water storage tank and throughout the distribution system at all times:

(A) a free chlorine residual of 0.2 mg/L; or

(B) a chloramine residual of 0.5 mg/L (measured as total chlorine) for those systems that feed ammonia.

(3) When chloramines are used as a disinfectant in the distribution system, the free ammonia levels of the water shall be monitored.

(A) Free ammonia levels in the water being treated shall be monitored each time the ammonia feed rate or chlorine to ammonia ratio is adjusted.

(B) Free ammonia levels in the water entering the distribution system shall be monitored at least once every seven days.

(C) Designated free ammonia sampling points shall be included in the system's monitoring plan and the chloramine and free ammonia levels shall be monitored at the same time at one or more of these sites at least once each month.

(e) Operation by trained and licensed personnel. Except as provided in paragraph (1) of this subsection, the production, treatment, and distribution facilities at the public water system must be operated at all times under the direct supervision of a water works operator who holds an applicable, valid license issued by the executive director.

(1) Transient noncommunity public water systems are exempt from the requirements of this subsection if they use only groundwater or purchase treated water from another public water system.

(2) All public water systems that are subject to the provisions of this subsection shall meet the following requirements.

(A) Public water systems shall not allow new or repaired production, treatment, storage, pressure maintenance, or distribution facilities to be placed into service without the prior guidance and approval of a licensed water works operator.

(B) Public water systems shall ensure that their operators are trained regarding the use of all chemicals used in the water treatment plant. Training programs shall meet applicable standards established by the Occupational Safety and Health Administration (OSHA) or the Texas Hazard Communications Act, Texas Health and Safety Code, Title 6, Chapter 502.

(C) Beginning January 1, 2004, public water systems using chlorine dioxide shall place the operation of the chlorine dioxide facilities under the direct supervision of a licensed operator who has a Class "C" or higher license.

(3) Systems that only purchase treated water shall meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Purchased water systems serving no more than 250 connections must employ an operator who holds a Class "D" or higher license.

(B) Purchased water systems serving more than 250 connections, but no more than 1,000 connections, must employ an operator who holds a Class "C" or higher license.

(C) Purchased water systems serving more than 1,000 connections must employ at least two operators who hold a Class "C" or higher license and who each work at least 16 hours per month at the public water system's treatment or distribution facilities.

(4) Systems that treat groundwater and do not treat surface water or groundwater that is under the direct influence of surface water shall meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Groundwater systems serving no more than 250 connections must employ an operator with a Class "D" or higher license.

(B) Groundwater systems serving more than 250 connections, but no more than 1,000 connections, must employ an operator with a Class "C" or higher groundwater license.

(C) Groundwater systems serving more than 1,000 connections must employ at least two operators who hold a Class "C" or higher groundwater license and who each work at least 16 hours per month at the public water system's production, treatment, or distribution facilities.

(5) Systems that treat groundwater that is under the direct influence of surface water must meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Systems which serve no more than 1,000 connections and utilize cartridge or membrane filters must employ an operator who holds a Class "C" or higher groundwater license and has completed a four-hour training course on monitoring and reporting requirements or who holds a Class "C" or higher surface water license and has completed the Groundwater Production course.

(B) Systems which serve more than 1,000 connections and utilize cartridge or membrane filters must employ at least two operators who meet the requirements of subparagraph (A) of this paragraph and who each work at least 24 hours per month at the public water system's production, treatment, or distribution facilities.

(C) Systems which serve no more than 1,000 connections and utilize coagulant addition and direct filtration must employ an operator who holds a Class "C" or higher surface water license and has completed the Groundwater Production course or who holds a Class "C" or higher groundwater license and has completed a Surface Water Production course. Effective January 1, 2007, the public water system must employ at least one operator who has completed the Surface Water Unit I course and the Surface Water Unit II course.

(D) Systems which serve more than 1,000 connections and utilize coagulant addition and direct filtration must employ at least two operators who meet the requirements of subparagraph (C) of this paragraph and who each work at least 24 hours per month at the public water system's production, treatment, or distribution facilities. Effective January 1, 2007, the public water system must employ at least two operators who have completed the Surface Water Unit I course and the Surface Water Unit II course.

(E) Systems which utilize complete surface water treatment must comply with the requirements of paragraph (6) of this subsection.

(F) Each plant must have at least one Class "C" or higher operator on duty at the plant when it is in operation or the plant must be provided with continuous turbidity and disinfectant residual monitors with automatic plant shutdown and alarms to summon operators so as to ensure that the water produced continues to meet the commission's drinking water standards during periods when the plant is not staffed.

(6) Systems that treat surface water must meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Surface water systems that serve no more than 1,000 connections must employ at least one operator who holds a Class "B" or higher surface water license. Part-time operators may be used to meet the requirements of this subparagraph if the operator is completely familiar with the design and operation of the plant and spends at least four consecutive hours at the plant at least once every 14 days and the system also employs an operator who holds a Class "C" or higher surface water license. Effective January 1, 2007, the public water system must employ at least one operator who has completed the Surface Water Unit I course and the Surface Water Unit II course.

(B) Surface water systems that serve more than 1,000 connections must employ at least two operators; one of the required operators must hold a Class "B" or higher surface water license and the other required operator must hold a Class "C" or higher surface water license. Each of

the required operators must work at least 32 hours per month at the public water system's production, treatment, or distribution facilities. Effective January 1, 2007, the public water system must employ at least two operators who have completed the Surface Water Unit I course and the Surface Water Unit II course.

(C) Each surface water treatment plant must have at least one Class "C" or higher surface water operator on duty at the plant when it is in operation or the plant must be provided with continuous turbidity and disinfectant residual monitors with automatic plant shutdown and alarms to summon operators so as to ensure that the water produced continues to meet the commission's drinking water standards during periods when the plant is not staffed.

(D) Public water systems shall not allow Class "D" operators to adjust or modify the treatment processes at surface water treatment plant unless an operator who holds a Class "C" or higher surface license is present at the plant and has issued specific instructions regarding the proposed adjustment.

(f) Operating records and reports. Water systems must maintain a record of water works operation and maintenance activities and submit periodic operating reports.

(1) The public water system's operating records must be organized, and copies must be kept on file or stored electronically.

(2) The public water system's operating records must be accessible for review during inspections.

(3) All public water systems shall maintain a record of operations.

(A) The following records shall be retained for at least two years:

(i) the amount of chemicals used:

(I) Systems that treat surface water or groundwater under the direct influence of surface water shall maintain a record of the amount of each chemical used each day.

(II) Systems that serve 250 or more connections or serve 750 or more people shall maintain a record of the amount of each chemical used each day.

(III) Systems that serve fewer than 250 connections, serve fewer than 750 people, and use only groundwater or purchased treated water shall maintain a record of the amount of each chemical used each week;

(ii) the volume of water treated:

(I) Systems that treat surface water or groundwater under the direct influence of surface water shall maintain a record of the amount of water treated each day.

(II) Systems that serve 250 or more connections or serve 750 or more people shall maintain a record of the amount of water treated each day.

(III) Systems that serve fewer than 250 connections, serve fewer than 750 people, and use only groundwater or purchase treated water shall maintain a record of the amount of water treated each week;

(iii) the date, location, and nature of water quality, pressure, or outage complaints received by the system and the results of any subsequent complaint investigation;

(iv) the dates that dead-end mains were flushed;

(v) the dates that storage tanks and other facilities were cleaned;

(vi) the maintenance records for water system equipment and facilities; and

(vii) for systems that do not employ full-time operators to meet the requirements of subsection (e) of this section, a daily record or a monthly summary of the work performed and the number of hours worked by each of the part-time operators used to meet the requirements of subsection (e) of this section.

(B) The following records shall be retained for at least three years:

(i) copies of notices of violation and any resulting corrective actions. The records of the actions taken to correct violations of primary drinking water regulations must be retained for at least three years after the last action taken with respect to the particular violation involved;

(ii) copies of any public notice issued by the water system;

(iii) the disinfectant residual monitoring results from the distribution system;

(iv) all free ammonia monitoring results;

(v) [(iv)] the turbidity monitoring results and exception reports for individual filters as required by §290.111 of this title (relating to Turbidity);

(vi) [(v)] the calibration records for laboratory equipment, flow meters, rate-of-flow controllers, on-line turbidimeters, and on-line disinfectant residual analyzers; and

(vii) [(vi)] the records of backflow prevention device programs.

(C) The following records shall be retained for a period of five years after they are no longer in effect:

(i) the records concerning a variance or exemption granted to the system;

(ii) Concentration Time (CT) studies for surface water treatment plants; and

(iii) the Recycling Practices Report form and other records pertaining to site-specific recycle practices for treatment plants that recycle.

(D) The following records shall be retained for at least five years:

(i) the results of microbiological analyses;

(ii) the results of inspections (as required in subsection (m)(1) of this section) for all water storage and pressure maintenance facilities; and

(iii) the results of inspections as required by subsection (m)(2) of this section for all pressure filters.

(E) The following records shall be retained for at least ten years:

(i) copies of Monthly Operating Reports and any supporting documentation including turbidity monitoring results of the combined filter effluent;

(ii) the results of chemical analyses;

(iii) any written reports, summaries, or communications relating to sanitary surveys of the system conducted by the system itself, by a private consultant, or by the executive director shall be kept for a period not less than ten years after completion of the survey involved; and

(iv) copies of the Customer Service Inspection reports required by subsection (j) of this section.

(F) A public water system shall maintain records relating to special studies and pilot projects, special monitoring, and other system-specific matters as directed by the executive director.

(4) Water systems shall submit routine reports and any additional documentation that the executive director may require to determine compliance with the requirements of this chapter.

(A) The reports must be submitted to the Texas Commission on Environmental Quality, Water Supply Division, MC 155, P.O. Box 13087, Austin, Texas 78711-3087 by the tenth day of the month following the end of the reporting period.

(B) The reports must contain all the information required by the drinking water standards and the results of any special monitoring tests which have been required.

(C) The reports must be completed in ink, typed, or computer-printed and must be signed by the certified water works operator.

(g) Disinfection of new or repaired facilities. Disinfection by or under the direction of water system personnel must be performed when repairs are made to existing facilities and before new facilities are placed into service. Disinfection must be performed in accordance with AWWA requirements and water samples must be submitted to a laboratory approved by the executive director. The sample results must indicate that the facility is free of microbiological contamination before it is placed into service. When it is necessary to return repaired mains to service as rapidly as possible, doses may be increased to 500 mg/L and the contact time reduced to 1/2 hour.

(h) Calcium hypochlorite. A supply of calcium hypochlorite disinfectant shall be kept on hand for use when making repairs, setting meters, and disinfecting new mains prior to placing them in service.

(i) Plumbing ordinance. Public water systems must adopt an adequate plumbing ordinance, regulations, or service agreement with provisions for proper enforcement to insure that neither cross-connections nor other unacceptable plumbing practices are permitted. See §290.47(b) of this title (relating to Appendices). Should sanitary control of the distribution system not reside with the purveyor, the entity retaining sanitary control shall be responsible for establishing and enforcing adequate regulations in this regard. The use of pipes and pipe fittings that contain more than 8.0% lead or solders and flux that contain more than 0.2% lead is prohibited for installation or repair of any public water supply and for installation or repair of any plumbing in a residential or nonresidential

facility providing water for human consumption and connected to a public drinking water supply system. This requirement may be waived for lead joints that are necessary for repairs to cast iron pipe.

(j) Customer service inspections. A customer service inspection certificate shall be completed prior to providing continuous water service to new construction, on any existing service either when the water purveyor has reason to believe that cross-connections or other potential contaminant hazards exist, or after any material improvement, correction, or addition to the private water distribution facilities. Any customer service inspection certificate form which varies from the format found in §290.47(d) of this title (relating to Customer Service Inspection Certificate) must be approved by the executive director prior to being placed in use.

(1) Individuals with the following credentials shall be recognized as capable of conducting a customer service inspection certification.

(A) Plumbing Inspectors and Water Supply Protection Specialists licensed by the Texas State Board of Plumbing Examiners.

(B) Customer service inspectors who [have completed a commission-approved course, passed an examination administered by the executive director, and hold current professional certification or endorsement as customer service inspector] hold a current customer service inspector license or endorsement that has been issued by the commission in accordance with the provisions of Chapter 30 of this title (relating to Occupational Licensing).

(2) As potential contaminant hazards are discovered, they shall be promptly eliminated to prevent possible contamination of the water supplied by the public water system. The existence of a health hazard, as identified in §290.47(i) of this title, shall be considered sufficient grounds for immediate termination of water service. Service can be restored only when the health hazard no longer exists, or until the health hazard has been isolated from the public water system in accordance with §290.44(h) of this title (relating to Water Distribution).

(3) These customer service inspection requirements are not considered acceptable substitutes for and shall not apply to the sanitary control requirements stated in §290.102(a)(5) of this title (relating to Definitions).

(4) A customer service inspection is an examination of the private water distribution facilities for the purpose of providing or denying water service. This inspection is limited to the identification and prevention of cross-connections, potential contaminant hazards, and illegal lead materials. The customer service inspector has no authority or obligation beyond the scope of the commission's regulations. A customer service inspection is not a plumbing inspection as defined and regulated by the Texas State Board of Plumbing Examiners (TSBPE). A customer service inspector is not permitted to perform plumbing inspections. State statutes and TSBPE adopted rules require that TSBPE licensed plumbing inspectors perform plumbing inspections of all new plumbing and alterations or additions to existing plumbing within the municipal limits of all cities, towns, and villages which have passed an ordinance adopting one of the plumbing codes recognized by TSBPE. Such entities may stipulate that the customer service inspection be performed by the plumbing inspector as a part of the more comprehensive plumbing inspection. Where such entities permit customer service inspectors to

perform customer service inspections, the customer service inspector shall report any violations immediately to the local entity's plumbing inspection department.

(k) Interconnection. No physical connection between the distribution system of a public drinking water supply and that of any other water supply shall be permitted unless the other water supply is of a safe, sanitary quality and the interconnection is approved by the executive director.

(l) Flushing of mains. All dead-end mains must be flushed at monthly intervals. Dead-end lines and other mains shall be flushed as needed if water quality complaints are received from water customers or if disinfectant residuals fall below acceptable levels as specified in §290.110 of this title (relating to Disinfectant Residuals).

(m) Maintenance and housekeeping. The maintenance and housekeeping practices used by a public water system shall ensure the good working condition and general appearance of the system's facilities and equipment. The grounds and facilities shall be maintained in a manner so as to minimize the possibility of the harboring of rodents, insects, and other disease vectors, and in such a way as to prevent other conditions that might cause the contamination of the water.

(1) Each of the system's ground, elevated, and pressure tanks shall be inspected annually by water system personnel or a contracted inspection service.

(A) Ground and elevated storage tank inspections must determine that the vents are in place and properly screened, the roof hatches closed and locked, flap valves and gasketing

provide adequate protection against insects, rodents, and other vermin, the interior and exterior coating systems are continuing to provide adequate protection to all metal surfaces, and the tank remains in a watertight condition.

(B) Pressure tank inspections must determine that the pressure release device and pressure gauge are working properly, the air-water ratio is being maintained at the proper level, the exterior coating systems are continuing to provide adequate protection to all metal surfaces, and the tank remains in watertight condition. Pressure tanks provided with an inspection port must have the interior surface inspected every five years.

(C) All tanks shall be inspected annually to determine that instrumentation and controls are working properly.

(2) When pressure filters are used, a visual inspection of the filter media and internal filter surfaces shall be conducted annually to ensure that the filter media is in good condition and the coating materials continue to provide adequate protection to internal surfaces.

(3) When cartridge filters are used, filter cartridges shall be changed at the frequency required by the manufacturer, or more frequently if needed.

(4) All water treatment units, storage and pressure maintenance facilities, distribution system lines, and related appurtenances shall be maintained in a watertight condition and be free of excessive solids.

(5) Basins used for water clarification shall be maintained free of excessive solids to prevent possible carryover of sludge and the formation of tastes and odors.

(6) Pumps, motors, valves, and other mechanical devices shall be maintained in good working condition.

(n) Engineering plans and maps. Plans, specifications, maps, and other pertinent information shall be maintained to facilitate the operation and maintenance of the system's facilities and equipment. The following records shall be maintained on file at the public water system and be available to the executive director upon request.

(1) Accurate and up-to-date detailed as-built plans or record drawings and specifications for each treatment plant, pump station, and storage tank shall be maintained at the public water system until the facility is decommissioned. As-built plans of individual projects may be used to fulfill this requirement if the plans are maintained in an organized manner.

(2) An accurate and up-to-date map of the distribution system shall be available so that valves and mains can be easily located during emergencies.

(3) Copies of well completion data such as well material setting data, geological log, sealing information (pressure cementing and surface protection), disinfection information, microbiological sample results, and a chemical analysis report of a representative sample of water from the well shall be kept on file for as long as the well remains in service.

(o) Filter backwashing at surface water treatment plants. Filters must be backwashed when a loss of head differential of six to ten feet is experienced between the influent and effluent loss of head gauges or when the turbidity level at the effluent of the filter reaches 1.0 NTU.

(p) Data on water system ownership and management. The agency shall be provided with information regarding water system ownership and management.

(1) When a water system changes ownership, a written notice of the transaction must be provided to the executive director. When applicable, notification shall be in accordance with Chapter 291 of this title (relating to Utility Regulations). Those systems not subject to Chapter 291 of this title shall notify the executive director of changes in ownership by providing the name of the current and prospective owner or responsible official, the proposed date of the transaction, and the address and phone number of the new owner or responsible official. The information listed in this paragraph and the system's public drinking water supply identification number, and any other information necessary to identify the transaction shall be provided to the executive director 120 days before the date of the transaction.

(2) On an annual basis, the owner of a public water system shall provide the executive director with a written list of all the operators and operating companies that the public water system employs. The notice shall contain the name, license number, and license class of each employed operator and the name and registration number of each employed operating company. See §290.47(g) of this title (relating to Appendices).

(q) Special precautions. Public water systems shall take special precautions and issue public health advisories to keep customers informed of water quality conditions that could affect them. [Special precautions must be instituted by the water system owner or responsible official in the event of low distribution pressures (below 20 psi), water outages, microbiological samples found to contain *E. coli* or fecal coliform organisms, failure to maintain adequate chlorine residuals, elevated finished water turbidity levels or other conditions which indicate that the potability of the drinking water supply has been compromised.]

(1) Special precautions must be instituted by the water system owner or responsible official in the event of low distribution pressures (below 20 psi), water outages, microbiological samples found to contain *E. coli* or fecal coliform organisms, failure to maintain adequate disinfectant residuals, elevated finished water turbidity levels or other conditions that indicate that the potability of the drinking water supply has been compromised.

(A) [(1)] Boil water notifications must be issued to the customers within 24 hours using the prescribed notification format as specified in §290.47(e) of this title (relating to Appendices). [Bilingual notification may be appropriate based upon local demographics.] Once the boil water notification is no longer in effect, the customers must be notified in a manner similar to the original notice.

(B) [(2)] The flowchart found in §290.47(h) of this title shall be used to determine if a boil water notification must be issued in the event of a loss of distribution system pressure. If a boil water notice is issued under this section, it shall remain in effect until water

distribution pressures in excess of 20 psi can consistently be maintained, a minimum of 0.2 mg/L free chlorine residual or 0.5 mg/L chloramine residual (measured as total chlorine) is present throughout the system, and water samples collected for microbiological analysis are found negative for coliform organisms.

(C) [(3)] A boil water notification shall be issued if the turbidity of the finished water produced by a surface water treatment plant exceeds 5.0 NTU. The boil water notice shall remain in effect until the water entering the distribution system has a turbidity level below 1.0 NTU, the distribution system has been thoroughly flushed, a minimum of 0.2 mg/L free chlorine residual or 0.5 mg/L chloramine residual (measured as total chlorine) is present throughout the system, and water samples collected for microbiological analysis are found negative for coliform organisms.

(2) Public water systems must comply with the public notification requirements contained in 30 TAC §290.122.

(3) Public water systems that use chloramines must take the following precautions.

(A) A public water system that uses chloramines must notify each of its retail and wholesale customers at least 14 days prior to beginning treatment with chloramines. This initial notice must include the wording contained in §290.47(k) of this title (relating to Appendices). The notification must be provided by either mail or hand delivery to each customer and local news media, renal disease facilities, dialysis clinics, hospitals, physicians, and health departments. Once a public water system's customers have been notified, a completed copy of the Certification of Delivery for

Public Notice form located in §290.47(l) of this title (relating to Appendices) must be submitted to the executive director with a copy of the public notice.

(B) A public water system that wholesales chloraminated water to other public water systems must notify the commission and each of its wholesale customers at least 14 days before converting back to free chlorine. This notice must be issued in writing and include the date that the wholesaler will begin distributing water that contains free chlorine and the date that wholesaler will revert back to chloramines.

(C) A public water system that distributes chloraminated water to retail customers must notify the commission at least 14 days before converting back to free chlorine. This notice must be issued in writing and include the date that the system will begin distributing water that contains free chlorine and the date that system will revert back to chloramines.

(4) Bilingual notification may be appropriate based on local demographics.

(5) [(4)] Other protective measures may be required at the discretion of the executive director.

(r) Minimum pressures. All public water systems shall be operated to provide a minimum pressure of 35 psi throughout the distribution system under normal operating conditions. The system shall also be operated to maintain a minimum pressure of 20 psi during emergencies such as fire fighting.

(s) Testing equipment. Accurate testing equipment or some other means of monitoring the effectiveness of any chemical treatment processes must be used by the system.

(1) Flow measuring devices and rate-of-flow controllers that are required by §290.42(d) of this title shall be calibrated at least once every 12 months. Well meters required by §290.41(c)(3)(N) of this title shall be calibrated at least once every three years.

(2) Laboratory equipment used for compliance testing shall be properly calibrated.

(A) pH meters shall be properly calibrated.

(i) Benchtop pH meters shall be calibrated according to manufacturers specifications at least once each day.

(ii) The calibration of benchtop pH meters shall be checked with at least one buffer each time a series of samples is run, and if necessary, recalibrated according to manufacturers specifications.

(iii) On-line pH meters shall be calibrated according to manufacturer specifications at least once every 30 days.

(iv) The calibration of on-line pH meters shall be checked at least once each week with a primary standard or by comparing the results from the on-line unit with the results

from a properly calibrated benchtop unit. If necessary, the on-line unit shall be recalibrated with primary standards.

(B) Turbidimeters shall be properly calibrated.

(i) Benchtop turbidimeters shall be calibrated with primary standards at least once every 90 days. Each time the turbidimeter is calibrated with primary standards, the secondary standards shall be restandardized.

(ii) The calibration of benchtop turbidimeters shall be checked with secondary standards each time a series of samples is tested, and if necessary, recalibrated with primary standards.

(iii) On-line turbidimeters shall be calibrated with primary standards at least once every 90 days.

(iv) The calibration of on-line turbidimeters shall be checked at least once each week with a primary standard, a secondary standard, or the manufacturer's proprietary calibration confirmation device or by comparing the results from the on-line unit with the results from a properly calibrated benchtop unit. If necessary, the on-line unit shall be recalibrated with primary standards.

(C) Disinfectant residual analyzers shall be properly calibrated.

(i) The accuracy of manual disinfectant residual analyzers shall be verified at least once every 30 days using chlorine solutions of known concentrations or an alternate method recommended by the instrument manufacturer. If necessary, the analyzer shall be recalibrated in accordance with the manufacturer's recommendations.

(ii) Continuous disinfectant residual analyzers shall be calibrated at least once every 90 days using chlorine solutions of known concentrations or an alternate method recommended by the instrument manufacturer. If necessary, the analyzer shall be recalibrated in accordance with the manufacturer's recommendations.

(iii) The calibration of continuous disinfectant residual analyzers shall be checked at least once each month with a chlorine solution of known concentration or by comparing the results from the on-line analyzer with the result of approved benchtop amperometric, spectrophotometric, or titration method.

(t) System ownership. All community water systems shall post a legible sign at each of its production, treatment, and storage facilities. The sign shall be located in plain view of the public and shall provide the name of the water supply and an emergency telephone number where a responsible official can be contacted.

(u) Abandoned wells. Abandoned public water supply wells owned by the system must be plugged with cement according to 16 TAC Chapter 76 (relating to Water Well Drillers and Water Well Pump Installers). Wells that are not in use and are non-deteriorated as defined in those rules must be

tested every five years or as required by the executive director to prove that they are in a non-deteriorated condition. The test results shall be sent to the executive director for review and approval. Deteriorated wells must be either plugged with cement or repaired to a non-deteriorated condition.

(v) Electrical wiring. All water system electrical wiring must be securely installed in compliance with a local or national electrical code.

§290.47 Appendices.

(a) Appendix A. Recognition as a Superior or Approved Public Water System.

Attached Graphic

(b) Appendix B. Sample Service Agreement.

Attached Graphic

(c) Appendix C. Sample Sanitary Control Easement Document for a Public Water Well.

Attached Graphic

(d) Appendix D. Customer Service Inspection Certification.

Attached Graphic

(e) Appendix E. Boil Water Notification.

Attached Graphic

(f) Appendix F. Sample Backflow Prevention Assembly Test and Maintenance Report.

Attached Graphic

(g) Appendix G. Operator and/or Employment Notice.

Attached Graphic

(h) Appendix H. Special Precautions.

Attached Graphic

(i) Appendix I. Assessment of Hazard and Selection of Assemblies for Premises Isolation.

Attached Graphic

(j) Appendix J. Assessment of Hazard and Selection of Assemblies for Installation at Internal Cross-Connection Hazards.

Attached Graphic

(k) Appendix K. Public Notification Language for Beginning Chloramine Treatment.

Attached Graphic

(l) Appendix L. Certification of Delivery.

Attached Graphic

(f) Appendix F. Sample Backflow Prevention Assembly Test and Maintenance Report.

The following form must be completed for each assembly tested. A signed and dated original must be submitted to the public water supplier for record keeping purposes:

BACKFLOW PREVENTION ASSEMBLY TEST AND MAINTENANCE REPORT *(1)*

NAME OF PWS: _____

PWS I.D.: #_____

MAILING ADDRESS: _____

CONTACT PERSON: _____

LOCATION OF SERVICE: _____

The backflow prevention assembly detailed below has been tested and maintained as required by commission regulations and is certified to be operating within acceptable parameters.

TYPE OF ASSEMBLY

☐ Reduced Pressure Principle ☐ Reduced Pressure Principle-Detector

☐ Double Check Valve ☐ Double Check-Detector

☐ Pressure Vacuum Breaker ☐ Spill-Resistant Pressure Vacuum Breaker

Manufacturer: _____ Size: _____

Model Number: _____ Serial Number [Located At]:_____

Assembly is located at: ☐ meter ☐ cross-connection [Serial Number: _____]

Description of Hazard: _____

Reason for Test: ☐ Installation of new device ☐ Annual/Routine inspection of an existing device

☐ Inspection of an existing device following a backflow incident (see Remarks)

Is the assembly installed in accordance with 30 TAC §290.44(h)(4)? [manufacturer recommendations and/or local codes?] _____

	Reduced Pressure Principle Assembly			Pressure Vacuum Breaker	
	Double Check Valve Assembly				
	1st Check	2nd Check	Relief Valve	Air Inlet	Check Valve
Initial Test	Held at ____ psid Closed Tight ☐ Leaked ☐	Held at ____ psid Closed Tight ☐ Leaked ☐	Opened at ___ psid Did not open ☐	Opened at ____ psid Did not open ☐	Held at ____ psid Leaked ☐
Repairs and Materials Used (2)					
Test After Repair	Held at ____ psid Closed Tight ☐	Held at ____ psid Closed Tight ☐	Opened at ___ psid	Opened at ____ psid	Held at ____ psid

Test gauge used: Make/Model_____ SN:_____ Tested for Accuracy [Calibration] Date:_____

Remarks: _____

_____

The above is certified to be true at the time of testing.

Firm Name _____ Certified Tester _____

Firm Address _____ Cert. Tester No. _____ Date_____

Firm Phone #_____

(1) The public water system must keep this test record for at least three years.

(2) Use only manufacturer's replacement parts.

[* TEST RECORDS MUST BE KEPT FOR AT LEAST THREE YEARS

** USE ONLY MANUFACTURER'S REPLACEMENT PARTS]

(i) Appendix I: Assessment of Hazards and Selection of Assemblies for Premises Isolation.

The following table lists many common hazards and the types of assemblies that shall be installed at the water meter unless the customer has an adequate internal cross-connection control program as described in 30 TAC §290.44(h)(1)(B). It is not an all-inclusive list of the hazards that require the installation of a backflow prevention assembly at the customer meter [which may be found connected to public water systems].

Premises Isolation - Description of Premises	Assessment of Hazard	Required Assembly
Aircraft and missile plants	Health	RPBA or AG
Animal feedlots	Health	RPBA or AG
Automotive plants	Health	RPBA or AG
Breweries	Health	RPBA or AG
Canneries, packing houses and rendering plants	Health	RPBA or AG
Commercial car wash facilities	Health	RPBA or AG
[Commercial laundries]	[Health]	[RPBA or AG]
Cold storage facilities	Health	RPBA or AG
Connection to sewer pipe	Health	AG
Dairies	Health	RPBA or AG
Docks and dockside facilities	Health	RPBA or AG
Dry-cleaning facilities	Health	RPBA or AG
Dye works	Health	RPBA or AG

Food and beverage processing plants	Health	RPBA or AG
Hospitals, morgues, mortuaries, medical clinics, dental clinics, veterinary clinics, autopsy facilities, sanitariums, and medical labs	Health	RPBA or AG
Metal manufacturing, cleaning, processing, and fabrication plants	Health	RPBA or AG
Microchip fabrication facilities	Health	RPBA or AG
Paper and paper products plants	Health	RPBA or AG
Petroleum processing or storage facilities	Health	RPBA or AG
Photo and film processing labs	Health	RPBA or AG
Plants using radioactive material	Health	RPBA or AG
Plating or chemical plants	Health	RPBA or AG
Pleasure-boat marinas	Health	RPBA or AG
Private/Individual/Unmonitored Wells	Health	RPBA or AG
Reclaimed water systems	Health	RPBA or AG
Restricted, classified or other closed facilities	Health	RPBA or AG
Rubber plants	Health	RPBA or AG
Sewage lift stations	Health	RPBA or AG
Sewage treatment plants	Health	RPBA or AG
Slaughter houses	Health	RPBA or AG
Steam plants	Health	RPBA or AG
Tall buildings or elevation differences where the highest outlet is 80 feet or more above the meter	Nonhealth	DCVA

NOTE: AG = air gap; DCVA = double check valve backflow prevention assembly;

RPBA = reduced-pressure principle backflow prevention assembly.

[***Remove this entire table and its footnotes (it's being amended and moved to Appendix J).***

Internal Protection - Description of Cross Connection	Assessment of Hazard	Required Assembly
Aspirators	Nonhealth†	AVB
Aspirator (medical)	Health	AVB or PVB
Autoclaves	Health	RPBA
Autopsy and mortuary equipment	Health	AVB or PVB
Bedpan washers	Health	AVB or PVB
Connection to industrial fluid systems	Health	RPBA
Connection to plating tanks	Health	RPBA
Connection to salt-water cooling systems	Health	RPBA
Connection to sewer pipe	Health	AG
Cooling towers with chemical additives	Health	AG
Cuspidors	Health	AVB or PVB
Degreasing equipment	Nonhealth†	DCVA
Domestic space-heating boiler	Nonhealth†	RPBA
Dye vats or machines	Health	RPBA
Fire-fighting system		
(toxic liquid foam concentrates)	Health	RPBA
Flexible shower heads		
Heating equipment	Nonhealth†	AVB or PVB
Commercial	Nonhealth†	RPBA

Domestic	Nonhealth†	DCVA
Hose bibbs	Nonhealth†	AVB
Irrigation systems		
with chemical additives	Health	RPBA
without chemical additives	Nonhealth†	DCVA, AVB,or PVB
Kitchen equipment - Commercial	Nonhealth†	AVB
Lab bench equipment	Health or Nonhealth†	AVB or PVB
Ornamental fountains	Health	AVB or PVB
Vending machines	Nonhealth†	RPBA
Swimming pools		
Private	Nonhealth†	PVB or AG
Public	Nonhealth†	RPBA or AG
Sewage pump	Health	AG
Sewage ejectors	Health	AG
Shampoo basins	Nonhealth†	AVB
Specimen tanks	Health	AVB or PVB
Steam generators	Nonhealth†	RPBA
Steam tables	Nonhealth†	AVB
Sterilizers	Health	RPBA
Tank vats or other vessels containing toxic		
substances	Health	RPBA
Trap primers	Health	AG

Watering troughs	Health	AG or PVB

NOTE: AG = air gap; AVB = atmospheric vacuum breaker; DCVA = double check valve backflow prevention assembly; PVB = pressure vacuum breaker; RPBA = reduced-pressure principle backflow prevention assembly.

*AVBs and PVBs may be used to isolate health hazards under certain conditions, that is, backsiphonage situations. Additional area of premises isolation may be required.

†Where a greater hazard exists (due to toxicity or other potential health impact) additional area protection with RPBAs is required.]

(j) Appendix J: Assessment of Hazards and Selection of Assemblies for Installation at Internal Cross-Connection Hazards

The following table lists many common hazards and the types of assemblies that may be used in an acceptable internal cross-connection program as described in §290.44(h)(1)(B) of this title (relating to internal cross connection programs). It is not an all-inclusive list of the hazards that may be found connected to public water systems.

Internal Protection - Description of Cross Connection	Assessment of Hazard	[Required] Assembly*
Aspirators	Nonhealth†	AVB
Aspirator (medical)	Health	AVB or PVB
Autoclaves	Health	RPBA
Autopsy and mortuary equipment	Health	AVB or PVB
Bedpan washers	Health	AVB or PVB
Boilers with chemical additives	Health	RPBA
Connection to industrial fluid systems	Health	RPBA
Connection to plating tanks	Health	RPBA
Connection to salt-water cooling systems	Health	RPBA
Connection to sewer pipe††	Health	AG
Cooling towers with chemical additives	Health	AG
Cuspidors	Health	AVB or PVB
Degreasing equipment	Nonhealth†	DCVA

Dye vats or machines	Health	RPBA
Fire-fighting system		
(toxic liquid foam concentrates)	Health	RPBA
Flexible shower heads		
Hose bibbs	Nonhealth†	AVB
Irrigation systems		
with chemical additives	Health	AG or RPBA
without chemical additives	Nonhealth†	DCVA, AVB, or PVB
Kitchen equipment - Commercial	Nonhealth†	AVB
Lab bench equipment	Health or Nonhealth†	AVB or PVB
Ornamental fountains	Health	AVB or PVB
Post-mix carbonated beverage dispensing		
machines	Nonhealth†	RPBA [or PVB]
Swimming pools		
Private	Nonhealth†	PVB or AG
Public	Nonhealth†	RPBA or AG
Sewage pump	Health	AG
Sewage ejectors	Health	AG
Shampoo basins	Nonhealth†	AVB
Specimen tanks	Health	AVB or PVB
Steam generators	Nonhealth†	RPBA
Steam tables	Nonhealth†	AVB

Sterilizers	Health	RPBA
Tank vats or other vessels containing toxic substances	Health	RPBA
Trap primers	Health	AG
Watering troughs	Health	AG or RPBA [PVB]

NOTE: AG = air gap; AVB = atmospheric vacuum breaker; DCVA = double check valve backflow prevention assembly; PVB = pressure vacuum breaker; RPBA = reduced-pressure principle backflow prevention assembly.

*AVBs and PVBs may only be used to isolate health hazards if the hazard is only subject to backsiphonage conditions [in backsiphonage situations]. Where the health hazard is also subject to backpressure, an air gap or RPBA is also required.

†Where a greater hazard exists (due to toxicity or other potential health impact) additional protection with an RPBA or AG is required.

†† Does not apply to domestic dishwashers installed in compliance with the International Residential Code or a plumbing code adopted by the Texas State Board of Plumbing Examiners.

(k) Appendix K. Sample Public Notice for Chloramine Users

On *[Date]*, the *[water system name]* will be changing the disinfectant that we use from chlorine to chloramines. This change is intended to benefit our customers by reducing the levels of disinfection byproducts (DBPs) in the system while still providing protection from waterborne disease. However, the change to chloramines can cause problems to persons dependent on dialysis machines. A condition known as hemolytic anemia can occur if the disinfectant is not completely removed from the water that is used for the dialysate. Consequently, the pretreatment scheme used for the dialysis units must include some means, such as a charcoal filter, for removing the chloramine prior to this date. Medical facilities should also determine if additional precautions are required for other medical equipment.

In addition, chloraminated water may be toxic to fish. If you have a fish tank, please make sure that the chemicals or filters that you are using are designed for use in water that has been treated with chloramines. You may also need to change the type of filter that you use for the fish tank.

If you have any questions regarding this matter you may contact _____(a)_____ at _____(b)_____

(a) Utility Official

(b) telephone number

INSTRUCTIONS

List more than one utility official and telephone number if available. Do not list the commission as the primary contact. If a customer wishes to call the commission, please have them call (512) 239-4691.

The public water system may not begin using chloramines prior to the date shown in the notice.

(l) Appendix L. Certificate of Delivery of Public Notice to Customers for Change from Free Chlorine to Chloramines

Texas Commission on Environmental Quality

CERTIFICATION of DELIVERY of PUBLIC NOTICE to CUSTOMERS

Public Water System (PWS) Name: _____

PWS I.D. (7-digit number required): _____

Date of Change to Chloramines _____

I, _____, certify that the following information is true and accurate:

(signature)

- The public water system named above has distributed the Public Notice (PN) for changing the disinfectant to chloramines at least 14 days prior to the change by mail or direct delivery to bill-paying customers as required by 30 TAC §290.46(q)(2); **and**
- The information contained in this public notification is correct and complies with required public notification content in accordance with 30 TAC §290.46(q)(2); **and**

- The above system has made an adequate good-faith effort to reach non-bill-paying consumers by appropriate methods as follows (check all that apply):

_____ Posting the PN on the Internet at www._____

_____ Mailing the PN to postal patrons within the service area that do not receive a bill

_____ Advertising the PN in news media

_____ Publication of PN in local newspaper

_____ Posting the PN in public places

_____ Delivery of multiple copies to single bill addresses serving several persons

_____ Delivery to community organizations

Date of Delivery to Customers: _____

Certified by: Name (print): _____

Title: _____

Phone #: _____ Date: _____

Signature: _____

Send one copy of this completed form and one copy of the Public Notification that you delivered to your customers to:

Texas Commission on Environmental Quality

Public Drinking Water Section - Mail Code 155

P. O. Box 13087

Austin, Texas 78711-3087