The Texas Commission on Environmental Quality (TCEQ, agency, commission) adopts the amendment to §290.44 *without change* to the proposed text as published in the October 11, 2013, issue of the *Texas Register* (38 TexReg 7083) and will not be republished.

Background and Summary of the Factual Basis for the Adopted Rule

The purpose of the adopted amendment is to reflect changes to the Texas Health and Safety Code (THSC), §341.042, from House Bill (HB) 2781, 83rd Legislature, 2013. These changes relate to structures that are connected to a public water system (PWS) and have a rainwater harvesting system (RWHS). Some of the changes to §290.44(j) required by HB 2781 were implemented through Rule Project No. 2011-057-290-OW, which was effective on September 12, 2013.

Section Discussion

§290.44, Water Distribution

The commission adopts §290.44(j) and its subdivisions to implement THSC, §341.042, as amended by HB 2781, for structures that have RWHSs and are connected to a PWS. The adopted rulemaking: removes the phrase "for indoor use" from §290.44(j), requiring all structures that are connected to a PWS and have an RWHS to have appropriate cross-connection safeguards; adds §290.44(j)(1) to require that a privately owned RWHS with a capacity of more than 500 gallons that is connected to a PWS for a

back-up supply must have a backflow prevention assembly or an air gap at the storage facility for the harvested rainwater; removes the word "indoor" from the phrase "for indoor potable purposes" in §290.44(j)(2), which refers to a RWHS that is connected to a PWS and must be installed and maintained by a master plumber or journeyman plumber licensed by the Texas State Board of Plumbing Examiners and who holds an endorsement issued by the Texas State Board of Plumbing Examiners as a Water Supply Protection Specialist; adds §290.44(j)(3), by renumbering existing §290.44(j)(1), which requires a person who intends to connect a RWHS to a PWS to give written notice to the municipality in which the RWHS is located or the owner or operator of the PWS, as amended to remove the phrase "for use for potable purposes," to improve the rule's organizational structure; and, adds §290.44(j)(4) to require that the PWS used as a back-up supply for the RWHS may be connected only to the water storage tank and may not be connected to the plumbing of a structure. HB 2781 uses the term "auxiliary water supply" to refer to a PWS that is being used as the back-up supply for a privately owned RWHS, however, throughout Chapter 290, the term "auxiliary" is used to describe a source that is connected to the PWS, such as a well that provides additional water for a surface water system. In order to maintain consistency with Chapter 290's established terminology, the executive director's staff refers to a back-up supply instead of an auxiliary water supply or an auxiliary water source as referenced in the legislation.

Final Regulatory Impact Analysis Determination

The commission reviewed the adopted rulemaking in light of the regulatory analysis requirements of Texas Government Code, §2001.0225, and determined that the rulemaking is not subject to Texas Government Code, §2001.0225 because it does not meet the definition of a "major environmental rule" as defined in the Texas Administrative Procedure Act. A "major environmental rule" is a rule that is specifically intended to protect the environment or reduce risks to human health from environmental 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.

This rulemaking does not meet the statutory definition of a "major environmental rule" because it is not the specific intent of the rule to protect the environment or reduce risks to human health from environmental exposure. The specific intent of the adopted rulemaking is to implement legislative changes enacted by HB 2781, which establish requirements for structures that have a RWHS and are connected to a PWS. The bill also contains language that states that a municipality or the owner or operator of a PWS may not be held liable for any adverse health effects allegedly caused by the consumption of water from an affected RWHS if the municipality or PWS is in compliance with the sanitary standards for drinking water adopted by the commission and applicable to the municipality or PWS.

Further, the rulemaking does not meet the statutory definition of a "major environmental rule" because the adopted rule will not 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 cost of complying with the adopted rule is not expected to be significant with respect to the economy.

Furthermore, the adopted rulemaking is not subject to Texas Government Code, §2001.0225 because it does not meet any of the four applicability requirements listed in Texas Government Code, §2001.0225(a). There are no federal standards governing RWHSs in Texas. Second, the adopted rulemaking does not exceed an express requirement of state law. Third, the adopted rulemaking 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 a state and federal program. Finally, the rulemaking is not adopted solely under the general powers of the agency, but specifically under THSC, §341.042, which allows the commission to adopt and enforce rules related to harvested rainwater.

The commission invited public comment regarding the draft regulatory impact analysis determination during the public comment period. No comments were received on the draft regulatory impact analysis determination.

Takings Impact Assessment

The commission evaluated the adopted rule and performed an assessment of whether the adopted rule constitutes a taking under Texas Government Code, Chapter 2007. The primary purpose of the adopted rulemaking is to implement legislative changes enacted by HB 2781, which establish requirements for structures that have RWHSs and are connected to a PWS. The bill also contains language that states that a municipality or the owner or operator of a PWS may not be held liable for any adverse health effects allegedly caused by the consumption of water from an affected RWHS if the municipality or PWS is in compliance with the sanitary standards for drinking water adopted by the commission and applicable to the municipality or PWS. The adopted rulemaking would substantially advance these purposes by amending Chapter 290 to incorporate the statutory requirements.

Promulgation and enforcement of this adopted rulemaking would be neither a statutory nor a constitutional taking of private real property. The adopted rulemaking does not affect a landowner's rights in private real property because this rulemaking does not relate to or have any impact on an owner's rights to property. This adopted rulemaking will primarily affect those persons who have a structure that has a RWHS and is connected to a PWS; this would not be an effect on real property. Therefore, the adopted rulemaking would not constitute a taking under Texas Government Code, Chapter 2007.

Consistency with the Coastal Management Program

The commission reviewed the adopted rule and found that it is neither identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(b)(2) or (4), nor will it affect any action/authorization identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(a)(6). Therefore, the adopted rule is not subject to the Texas Coastal Management Program.

The commission invited public comment regarding the consistency with the Coastal Management Program during the public comment period. The commission did not receive any comments regarding the adopted rulemaking's consistency with the Coastal Management Program.

Public Comment

The commission held a public hearing on November 5, 2013. At the November 5, 2013, public hearing no one offered comments on the proposed rule. The comment period closed on November 12, 2013. The commission received written comments from Innovative Water Solutions, LLC (IWS); Pair Plumbing and Septic; Texas Rainwater Catchment Association; and one individual. No commenters expressed opposition to the entire rule as proposed. IWS suggested alternative rule language. Texas Rainwater Catchment Association requested the commission amend the statute. The written

comments are summarized in the Response to Comments section of the preamble.

Response to Comments

An individual requested that the commission protect the brown pelicans.

The commission responds that the adopted rule addresses RWHSs that are connected to a PWS and does not pertain to brown pelicans. This comment is outside the scope of this rulemaking. No change has been made in response to this comment.

Pair Plumbing and Septic expressed interest "in seeing how the harvesting of rain water can economically be done without cross-connecting to raw sewerage/Septic systems and Domestic Potable water systems."

The commission responds that Chapter 290 addresses RWHSs that are connected to a PWS. The adopted rule prohibits RWHSs from being connected to a PWS without proper cross-connection protection. The commission's stated mission is to "protect our state's public health and natural resources consistent with sustainable economic development. Our goal is clean air, clean water, and the safe management of waste." Allowing a RWHS to be connected to a raw sewerage/septic system would be counter

to that objective as raw sewage contains various pathogens (bacteria, parasites, and viruses) and may contain chemical toxins (heavy metals, pesticides, and pharmaceuticals). No change has been made in response to this comment.

Pair Plumbing and Septic also commented that conventional septic systems should be installed, instead of aerobic septic systems, in order to replenish ground water.

The commission responds that the adopted rule addresses RWHSs that are connected to a PWS and does not pertain to septic systems. This comment is outside the scope of this rulemaking; therefore, no change has been made in response to this comment.

IWS commented that the term "connection" in §290.44(j) is ambiguous and can be interpreted in different ways. Depending on the context, it could be construed to mean a metered residence or a physical connection between RWHS piping and PWS piping and that any residence with a RWHS that is also supplied by a PWS would be required to install a reduced-pressure principle backflow prevention assembly device, regardless of the size, design, or use of the privately owned RWHS. Additionally, the commission's requirement to install a reduced-pressure principle backflow prevention assembly device would increase the RWHSs cost of installation. Texas Rainwater Catchment

Association commented that they seek a clear and universal understanding of the language found in the laws, rules, and regulations relating to rainwater harvesting. Texas Rainwater Catchment Association also requested the commission "amend the code language" in response to their comment.

The commission responds that the words and terms used within Chapter 290 have the meanings defined in §290.38, unless otherwise indicated. Those terms are clearly defined and consistently used by the commission in this rulemaking. The commission has established a definition for "connection" in existing §290.38(15) as, "A single family residential unit or each commercial or industrial establishment to which drinking water is supplied from the system ... 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." Based upon that definition, the presence of a backflow prevention device or an air gap does not mean that the customer's water service is then disconnected from the PWS, thus creating a stand-alone private water system. The commission also responds that, according to §290.47(i), the specific type of backflow prevention device required for a RWHS is either an air gap or a reduced-pressure principle backflow prevention assembly. While the commission requires the use of a backflow prevention device, it is up to the local municipality to determine whether a reduced-pressure principle backflow prevention assembly device or an air gap is required. Further, the commission responds that this rule implements only the changes made by HB 2781, 83rd Legislature, 2013, which amended THSC, §341.042. If additional legislative changes are implemented, the commission will evaluate those changes and if necessary, consider implementing a rulemaking. No changes have been made in response to these comments.

Texas Rainwater Catchment Association commented that the term "connection" appears in several sections of the proposed rule and it is their position that once a backflow prevention assembly device is installed downstream of the water meter, the metered

water supply is appropriately protected.

The commission requires appropriate cross-connection control protections for structures that are connected to PWSs and have a RWHS. The commission agrees that the appropriate backflow prevention assembly, if properly maintained and tested, does appropriately protect the PWS. No change has been made in response to this comment.

IWS commented that in §290.44(j)(1), the use of "connected" refers to the physical relationship between the RWHS and the PWS supply when the PWS is intended to provide back-up water to the RWHS tank. IWC further commented that it takes no issue with the language as proposed.

The commission acknowledges this comment. No change has been made in response to this comment.

IWS commented that if the term "connection" as used in §290.44(j)(2) is meant to mirror the term's use in §290.44(j), the rule language places restrictions on all RWHSs installed within the jurisdiction of a PWS (if the property is a metered residence) where the collected water is suitable for drinking, making it illegal for a private residence (other than the residences of master or journeyman plumbers) to capture, store, and

treat rainwater for any use, regardless of a physical separation from the PWS and the RWHS's piping. IWS also commented that in §290.44(j)(2), "connection" could mean that a RWHS must be installed and maintained by a master plumber only when there is a physical connection between the RWHS and the PWS and that "the only interpretation of this language that would be consistent with the rest of Chapter 290 would be one that made clear that the term 'connection' points to the nature of the physical relationship between PWS piping and RWHS piping."

The commission responds that the words and terms used within Chapter 290 have the meanings defined in §290.38. The commission has established a definition for "connection" in existing §290.38(15), as stated in this section of the preamble. No change has been made in response to this comment.

IWS commented that in §290.44(j)(4) the term "potable" is not present and this subsection does not clearly define how the use of the rainwater relates to the plumbing of a structure. IWS provided a drawing with their submitted rule comments and asked whether §290.44(j)(4) be interpreted to mean that installation of RWHSs used for irrigation supply would be prohibited if it includes a back-up water connection to a PWS, regardless of the cross-connection safeguards in place. In referring to their provided drawing, IWS questioned: 1) whether a reduced-pressure principle backflow

prevention assembly device or air gap breaks the connection from the PWS; and 2) if so, why there is a need to prohibit the connection to a structure when the connection is made after the appropriate cross-connection safeguards.

The commission responds that HB 2781 was silent regarding the use of potable versus non-potable when amending THSC, §341.042(b-3). HB 2781 amended THSC, §341.042(b-3), to specify that "the public water supply system used as an auxiliary water source may be connected only to the water storage tank and may not be connected to the plumbing of a structure." The legislation does not prohibit the installation of a RWHS as long as appropriate cross-connection safeguards are in place. Based upon the definition of a connection in §290.38(15), the presence of a backflow prevention device or an air gap does not mean that the customer's water service is disconnected from the PWS. Moreover, the commission is not prohibiting the connection to a structure when the connection is made after appropriate cross-connection safeguards are in place; however, the commission is prohibiting the connection to the internal plumbing of a structure to implement the provisions of HB 2781, as passed by the 83rd Legislature. No changes have been made in response to this comment.

SUBCHAPTER D: RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS
§290.44

Statutory Authority

This amendment is adopted under Texas Water Code (TWC), §5.102, which establishes the commission's general authority necessary to carry out its jurisdiction; TWC, §5.103, which establishes the commission's general authority to adopt rules; TWC, §5.105, which establishes the commission's authority to set policy by rule; and Texas Health and Safety Code (THSC), §341.042, which allows the commission to adopt rules relating to the domestic use of harvested rainwater. Therefore, the TWC and THSC authorize rulemaking that amend §290.44, which relates to structures that have rainwater harvesting systems (RWHS) and are connected to a public water system (PWS).

The adopted amendment implements the language set forth in House Bill (HB) 2781, 83rd Legislature, 2013, which requires the commission to amend the existing rule for structures that have RWHSs and are connected to a PWS by requiring such structures to have appropriate cross-connection safeguards and to be installed by a specially-licensed plumber. Additionally, HB 2781 requires that a RWHS that is connected to a PWS for use as a back-up supply may not also have the plumbing of the structure connected to the PWS. HB 2781 also removes the phrase "for indoor use" when referring to such structures.

§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 pipes for use in public water systems must also bear the National Sanitation Foundation Seal of Approval (NSF-pw) and have an ASTM design pressure rating of at least 150 pounds per square inch (psi) or a standard dimension ratio of 26 or less.

(3) No pipe 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.

(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.

(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 less than 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.

Figure: 30 TAC §290.44(c) (No change to the figure as it currently exists in TAC.)

(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. The distribution system of public water systems that are also affected utilities must be designed to meet the requirements of §290.45(h) of this title (relating to Minimum Water System Capacity Requirements).

(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 to 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 an annual inspection and testing by a licensed backflow prevention assembly tester on all backflow prevention assemblies used for health hazard protection.

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

(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 table located in §290.47(i) of this title shall be tested upon installation by a licensed backflow prevention assembly tester and certified to be operating within specifications. Backflow prevention assemblies 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 licensed backflow prevention assembly tester.

(A) 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 a current license as a backflow prevention assembly tester.

(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 may test and repair assemblies on firelines only if they are permanently employed by an Approved Fireline Contractor. The State Fire Marshal'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 AWWA's Recommended Practice for Backflow Prevention and Cross-Connection Control (AWWA 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 milligrams per liter (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.

(j) If a structure is connected to a public water supply system and has a rainwater harvesting system, the structure must have appropriate cross-connection safeguards in accordance with subsection (h)(1) of this section.

(1) A privately owned rainwater harvesting system with a capacity of more than 500 gallons that is connected to a public water system for a back-up supply shall have a backflow prevention assembly or an air gap installed at the storage facility for the harvested rainwater to ensure physical separation between the rainwater harvesting system and the public water system.

(2) At each residence or facility where water from a rainwater harvesting system is used for potable purposes and there is a connection to a public water system, the public water system shall ensure that the rainwater harvesting system is installed and maintained by a master plumber or journeyman plumber licensed by the Texas State Board of Plumbing Examiners and who holds an endorsement issued by the Texas State Board of Plumbing Examiners as a Water Supply Protection Specialist.

(3) A person who intends to connect a rainwater harvesting system to a public water system must give written notice of that intention to the municipality or the owner or operator of the public water system in which the rainwater harvesting system is located.

(4) The public water system used as a back-up supply for the rainwater harvesting system may be connected only to the water storage tank and may not be connected to the plumbing of a structure.