

**SUBCHAPTER B: GENERAL REQUIREMENTS FOR THE PRODUCTION,
CONVEYANCE, AND USE OF RECLAIMED WATER**

**§§210.21 - 210.25
Effective February 12, 1997**

§210.21. Applicability.

This subchapter establishes general requirements applicable to producers, providers, and users of reclaimed water. This subchapter also establishes requirements and specifications for transfer, storage, and irrigation using reclaimed water and design criteria of reclaimed water systems. Additionally, this subchapter establishes requirements and specifications necessary to minimize discharges of waste into or adjacent to waters in the state.

Adopted January 8, 1997

Effective February 12, 1997

§210.22. General Requirements.

(a) Reuse of untreated wastewater is prohibited.

(b) Food crops that may be consumed raw by humans shall not be spray irrigated. Food crops including orchard crops that will be substantially processed prior to human consumption may be spray irrigated. Other types of irrigation that avoid contact of reclaimed water with edible portions of food crops are acceptable.

(c) There shall be no nuisance conditions resulting from the distribution, the use, and/or storage of reclaimed water.

(d) Reclaimed water shall not be utilized in a way that degrades ground water quality to a degree adversely affecting its actual or potential uses.

(e) Reclaimed water managed in ponds for storage must be prevented from discharge into waters in the state, except for discharges directly resulting from rainfall events or in accordance with a permit issued by the commission. All other discharges are unauthorized. If any unauthorized overflow of a holding pond occurs causing discharge into or adjacent to waters in the state, the user or provider, as appropriate, shall report the noncompliance. A written submission of such information shall also be provided to the TNRCC regional office and to the Austin Office, Water Enforcement Section (MC-149), within five (5) working days of becoming aware of the overflow. The written submission shall contain a description of the noncompliance and its cause; the potential danger to human health or safety, or the environment; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the anticipated time it is expected to

continue; and, steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance, and to mitigate its adverse effects.

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§210.23. Storage Requirements for Reclaimed Water.

(a) Except for authorized on-channel ponds, storage facilities for retaining reclaimed water prior to use shall not be located within the floodway.

(b) Except as provided by subsection (e) of this section, all initial holding ponds must be lined in accordance with either subsection (c) or (d) of this section, as appropriate.

(c) All initial and subsequent holding ponds containing Type I and Type II effluent, located within the recharge zone of the Edwards Aquifer, as defined in Chapter 213 of this title (relating to Edwards Aquifer), and all initial holding ponds containing Type II effluent, located in a vulnerable area as defined by a rating of 110 or greater on the statewide "*Ground-Water Pollution Potential - General, Municipal, and Industrial Sources*" (DRASTIC) map (as shown in Figure 1 of this chapter), shall conform to the following requirements:

(2) Soils used for pond lining shall be free from foreign material such as paper, brush, trees, and large rocks;

(3) All soil liners must be of compacted material, at least 24 inches thick, compacted in lifts no greater than 6 inches thick and compacted to 95% of Standard Proctor Density. In-situ clay soils meeting the soils liner requirements shall be excavated and re-compacted a minimum of 6 inches below planned grade to assure a uniformly compacted finished surface.

(4) Soil liners must meet the following particle size gradation and Atterberg limits:

(A) 30% or more passing a number 200 mesh sieve; and

(B) a liquid limit of 30% or greater; and a plasticity index of 15 or greater and have a permeability less than or equal to 1×10^{-7} cm/sec;

(5) Synthetic membrane linings shall have a minimum thickness of 40 mils with a leak detection system. In situ liners at least 24 inches thick meeting a permeability less than or equal to 1×10^{-7} cm/sec are acceptable alternatives;

(6) Certification shall be furnished by a Texas Registered Professional Engineer that the pond lining meets the appropriate criteria prior to utilization of the facilities; and

(7) Soil embankment walls shall have a top width of at least five feet. The interior and exterior slopes of soil embankment walls shall be no steeper than one foot vertical to three feet horizontal unless alternate methods of slope stabilization are utilized. All soil embankment walls shall be protected by a vegetative cover or other stabilizing material to prevent erosion. Erosion stops and water seals shall be installed on all piping penetrating the embankments.

(d) All initial holding ponds designed to contain Type I effluent, located outside of the recharge zone of the Edwards Aquifer, and Type II effluent, located in areas in the state not identified in subsection (c) of this section shall conform to the following requirements:

(1) The ponds, whether constructed of earthen or other impervious materials, shall be designed and constructed so as to prevent groundwater contamination;

(2) Soils used for pond lining shall be free from foreign material such as paper, brush, trees, and large rocks;

(3) All soil liners must be of compacted material having a permeability less than or equal to 1×10^{-4} cm/sec, at least 24 inches thick, compacted in lifts no greater than 6 inches each;

(4) Synthetic membrane linings shall have a minimum thickness of 40 mils. In situ liners at least 24 inches thick meeting a permeability less than or equal to 1×10^{-4} cm/sec are acceptable alternatives;

(5) Certification shall be furnished by a Texas Registered Professional Engineer that the pond lining meets the appropriate criteria prior to utilization of the facilities; and

(6) Soil embankment walls shall have a top width of at least five feet. The interior and exterior slopes of soil embankment walls shall be no steeper than one foot vertical to three feet horizontal unless alternate methods of slope stabilization are utilized. All soil embankment walls shall be protected by a vegetative cover or other stabilizing material to prevent erosion. Erosion stops and water seals shall be installed on all piping penetrating the embankments.

(7) An alternative method of pond lining which provides equivalent or better water quality protection than provided under this section may be utilized with the prior approval of the executive director.

(8) A specific exemption may be obtained from the executive director if, after the review of data submitted by the reclaimed water provider or user, as appropriate, the executive director determines containment of the reclaimed water is not necessary, considering:

(A) soil and geologic data, and ground water data, including its quality, uses, quantity and yield; and

(B) adequate demonstration that impairment of ground water for its actual or potential use will be prevented.

(e) Reclaimed water may be stored in leak-proof, fabricated tanks.

(f) Subsequent holding ponds utilized for the receipt and storage of reclaimed water of a quality that could cause or causes a violation of a surface water quality standard or impairment of ground water for its actual or intended use will also be subject to the storage requirements of this section.

§210.24. Irrigation Using Reclaimed Water.

(a) The reclaimed water user shall provide reasonable control of the application rates for reclaimed water applied to irrigation areas. These controls shall encourage the efficient use of reclaimed water and avoid excessive application of reclaimed water that results in surface runoff or excessive percolation below the root zone.

(b) The reclaimed water provider or user, as applicable shall determine and document typical irrigation demands for the proposed use based on type of vegetation and land area to be irrigated. As one alternative, a typical method for determining irrigation needs is shown in Table 1 of this section. However, other alternative methods may be used.

Figure: 30 TAC §210.24(b)

TABLE 1
WATER BALANCE EXAMPLE
(All Units are Inches of Water per Acre of Irrigated Area)

Month	a Average Precipitation	b Average Runoff	Ri Average Infil- trated Rainfall	c Evapo- Transp- iration	d Required Leaching	Total Water Needs (5)+ (6)	Effluent Needed in Root Zone (7)-(4)	e Evapo- ration from Reservoir Surface	f Effluent to be Applied to Land (8)/K	g Consumption from Reservoir (9)+(10)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Jan.	2.11	0.40	1.71	0.80	0.00	0.80	0.00	0.02	0.00	0.02
Feb.	2.43	0.57	1.86	1.20	0.00	1.20	0.00	0.01	0.00	0.01
Mar.	2.02	0.36	1.66	2.80	0.20	3.00	1.34	0.09	1.58	1.67
Apr.	3.19	1.03	2.16	3.40	0.22	3.62	1.46	0.05	1.72	1.77
May	4.19	1.74	2.45	6.10	0.64	6.74	4.29	0.10	5.05	5.15
June	3.30	1.10	2.20	6.50	0.76	7.26	5.06	0.20	5.95	6.15
July	2.20	0.45	1.75	6.70	0.87	7.57	5.82	0.34	6.85	7.19
Aug.	2.12	0.41	1.71	4.60	0.51	5.11	3.40	0.34	4.00	4.34
Sept.	3.58	1.30	2.28	5.10	0.50	5.60	3.32	0.19	3.91	4.10
Oct.	3.09	0.96	2.13	4.10	0.35	4.45	2.32	0.14	2.73	2.87
Nov.	2.23	0.46	1.77	2.10	0.06	2.16	0.39	0.07	0.46	0.53
Dec.	2.34	0.52	1.82	1.00	0.00	1.00	0.00	0.03	0.00	0.03
	32.80	9.30	23.50	44.40	4.11	48.51	27.40	1.58	32.25	33.83

Table 1 Footnotes

a. Up-to date rainfall and evaporation data sets are available from the Texas Natural Resources Information System.

b. Runoff should be determined by an acceptable method such as the Soil Conservation Service method found in SCS Technical Releases No. 55. For calculation purposes only, a CN value of 74 was assumed for good pasture with Class "C" soils.

c. Suggested source of values is the "Bulletin 6019, Consumptive Use of Water by Major Crops in Texas", Texas Board of Water Engineers.

d. In low rainfall areas, this is the required leaching to avoid salinity build-up in the soil where:

$$L = \frac{C_e}{C_1 - C_e} (E - R_i)$$

R_i = Infiltrated rainfall
C₁-C_e

C_e = Electrical conductivity of effluent

C₁ = Maximum Allowable Conductivity of Soil Solution (Table 3)

E = Evapotranspiration

For calculation purposes only, C_e is measured to be 1.5 millimhos/cm @ 25° and C_1 is 10.0 (Bermuda Grass)

- e. Net evaporation from reservoir surface. For the purpose of calculation, an assumption must be made as to the ratio of irrigated land area to reservoir surface area. For this example problem, the necessary reservoir area was assumed to be 17% of the irrigated area. If, after all calculations are made, the reservoir dimensions do not seem reasonable, then a new assumption must be made and the calculations repeated. Values in column (9) are adjusted to be inches per irrigated acre.
- f. K is the irrigation efficiency which for this example is taken to be 0.85.
- g. The total of this column together with the expected annual volume of effluent will determine the acreage of irrigated land required.

(c) The reclaimed water provider shall be responsible for conducting periodic audits of appropriate controls implemented by reclaimed water users. Other typical irrigation operational considerations that must be addressed include the following:

(1) Irrigation of Food Crops.

(A) Irrigation of edible crops that will be peeled, skinned, cooked, or thermally processed before consumption is allowed. Direct contact of the reclaimed water with such crops is allowed.

(B) Irrigation of citrus fruit is allowed. Direct contact of the reclaimed water with citrus is allowed.

(C) Irrigation of edible crops that will not be peeled, skinned, cooked, or thermally processed before consumption is allowed if an indirect application method is used which will preclude the direct contact with the reclaimed water. For instance, a ridge and furrow, drip irrigation, or a subsurface distribution system may be used to irrigate such above ground crops. However, these methods would not be suitable for crops such as carrots or radishes.

(D) Irrigation of edible crops that will not be peeled, skinned, cooked, or thermally processed before consumption that allows for direct contact of the reclaimed water on the crop is prohibited.

(2) Irrigation of pastures used by animals milked for human consumption shall be conducted in a manner to avoid contact of reclaimed water with such animals.

(3) Irrigation of landscaped areas:

(A) Application of reclaimed water on public access facilities shall be controlled by agreement with the reclaimed water provider or by local ordinance.

(B) Reclaimed water may not be used to fill swimming pools, hot tubs, wading pools, or other structures designed for contact recreation.

(d) General irrigation requirements.

(1) A provider or user designing or operating an irrigation system using reclaimed water is responsible for ensuring that reclaimed water overflow, crop stress, and undesirable soil contamination by a salt does not occur. To prevent such occurrences, the provider or user is required to consider, evaluate, and respond appropriately to the following factors as the need arises:

(A) Precipitation inputs to the water balance should utilize the average monthly precipitation based on past rainfall records.

(B) The consumptive use requirements (evapotranspiration losses) of the crop system should be developed on a monthly basis. The method of determining the consumptive use requirement shall be documented by the provider or user as a part of the water balance study and the records of the study maintained for possible commission review.

(C) A leaching requirement, calculated as shown in Table 1 of this section, shall be included in the water balance study when the total dissolved solids concentration of the reclaimed water presents the potential for developing excessive soil salinity buildup due to the long term operation of the irrigation system.

(2) The irrigation site must be maintained with a vegetative cover or be under cultivation during times when reclaimed water is being applied.

(3) The irrigation practices shall be designed so as to prevent incidental ponding or standing water except where local farming conditions and the accepted irrigation delivery systems and cropping patterns are such that, as an unavoidable consequence of such conditions, systems, and patterns, there will be standing water.

(4) Irrigation application rates and application times shall be developed so as to minimize "wet grass" conditions in unrestricted landscaped areas during the periods the area could be in use.

(5) Irrigation systems shall be designed so that the irrigation spray does not reach any privately-owned premises outside the designated irrigation area or reach public drinking fountains.

(6) There shall be no application of effluent when the ground is water saturated or frozen.

(7) Distribution systems must be designed to prevent operation by unauthorized personnel.

(8) Irrigation operations shall be managed in a manner to minimize the inadvertent contact of reclaimed water with humans.

(9) Operational or tailwater controls shall be provided to preclude discharge of reclaimed water from irrigation sites.

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Effective February 12, 1997

§210.25. Special Design Criteria for Reclaimed Water Systems.

(a) All hose bibs and faucets shall be painted purple and designed to prevent connection to a standard water hose. Hose bibs shall be located in locked, below grade vaults which shall be clearly labeled as being of non-potable quality. As an alternative to the use of locked, below grade vaults with standard hose bib services, hose bibs may be placed in a non-lockable service box which can only be operated by a special tool so long as the hose bib is clearly labeled as non-potable water, in accordance with subsection (b) of this section.

(b) One of the following requirements must be met by the user or provider, for any area where reclaimed water is stored or where there exist hose bibs or faucets:

(1) Signs having a minimum size of eight inches by eight inches, as shown in Figure 1, shall be posted at all storage areas and on all hose bibs and faucets reading, in both English and Spanish, "Reclaimed Water, Do Not Drink" or similar warning.

FIGURE 1: 30 TAC §210.25(b)(1)



DO NOT DRINK THE WATER

NO TOMAR EL AGUA

(2) The area shall be secured to prevent access by the public.

(c) Reclaimed water piping shall be separated from potable water piping by a horizontal distance of at least nine feet. Where the nine foot separation distance cannot be achieved, the reclaimed water piping must meet the line separation requirements of Chapter 290 of this title (relating to Water Hygiene).

(d) Where a reclaimed water line parallels a sewer line, the reclaimed water line shall be constructed in accordance with subsection (e) or (f) of this section. The horizontal separation distance shall be three feet (outside to outside) with the reclaimed water line at the level of or above the sewer line. Reclaimed water lines which parallel sewer lines may be placed in the same benched trench. Where a reclaimed water line crosses a sewer line, the requirements of §290.44(e)(5)(B) of this title (relating to Location of Water Lines) shall be followed, with "reclaimed water line" substituted in §290.44(e) of this title (relating to Location of Water Lines) for "water line."

(e) Reclaimed water lines which transport reclaimed water under pressure shall be sized according to acceptable engineering practices for the needs of the reclaimed water users. The designer shall consider methods to prevent or maintain lines to mitigate the effect of the deposition of solids in such lines. Pipe specified for reclaimed water force mains shall be of a type having an expected life at least as long as that of the lift station and shall be suitable for the reclaimed water being pumped and operating pressure to which it will be subjected. All pipe shall be identified in the technical specifications with appropriate American Society for Testing and Materials, American National Standard Institute, or American Water Works Association (AWWA) standard numbers for both quality control (dimensions, tolerance, and installation such as bedding or backfill). All pipes and fittings shall have a minimum working pressure rating of 150 pounds per square inch. Final plans and specifications shall describe required pressure testing for all installed reclaimed water force mains. Minimum test pressure shall be 1.5 times the maximum design pressure. Allowable leakage rates shall be determined as described in §317.2(d)(4) of this title (relating to Pressure Sewer Systems).

(f) Gravity flow reclaimed water lines shall meet the requirements of §317.2(a) of this title (relating to General Requirements) and §317.2(c) of this title (relating to High Velocity Protection). The designer shall consider methods to prevent high velocity scour or maintain line fluid velocity to mitigate the effects of the deposition of solids in the gravity conveyance.

(g) All exposed piping and piping within a building shall be either purple pipe or painted purple. All buried piping installed after the effective date of these rules shall be one of the following: manufactured in purple, painted purple, taped with purple metallic tape, or bagged in purple. All exposed piping should be stenciled in white with a warning reading "NON-POTABLE WATER." All exposed or buried reclaimed water piping constructed at a wastewater treatment facility is exempt from the color coding requirements of this section.

(h) When applicable, in accordance with §317.1(a)(3) - (4) of this title, (relating to General Provisions), the design of distribution systems which will convey reclaimed water to a user shall be submitted to the executive director and must receive an approval. The design of the distribution systems must meet the requirements of Chapter 317 of this title (relating to Design Criteria for Sewerage Systems). Where a municipality is the plan review authority for certain sewer systems which transport primarily domestic waste, in accordance with §317.1(a)(5) of this title, in lieu of the commission, design submittal will not be subject to submittal to the commission and instead must be approved by the municipality. Materials shall be submitted for approval by the executive director in accordance with the Texas Engineering Practice Act (Article 3271a, Vernon's Annotated Texas Statutes).

(i) All ground level and elevated storage tanks shall be designed, installed, and constructed in accordance with current AWWA standards with reference to materials to be used and construction practices to be followed, except for health-based standards strictly related to potable water storage and contact practices, where appropriately less restrictive standards may be applied.

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