



COLORADO

Water Quality
Control Commission

Department of Public Health & Environment

DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Water Quality Control Commission

REGULATION NO. 84 - RECLAIMED WATER CONTROL REGULATION

5 CCR 1002-84

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84.1 AUTHORITY

This regulation is promulgated pursuant to the Colorado Water Quality Control Act (CWQCA) section 25-8-101 through 25-8-703, C.R.S. In particular, it is promulgated under sections 25-8-202, 25-8-205, and 25-8-205.8, C.R.S.

Materials incorporated by reference are available for public inspection during normal business hours, or copies may be obtained at reasonable cost, from the Administrator, Water Quality Control Commission, 4300 Cherry Creek Drive South, Denver, Colorado 80246. Unless expressly stated otherwise, materials incorporated by reference are those editions dated as referenced by date in the regulation or in existence as of the date this regulation is promulgated or revised by the Water Quality Control Commission and references do not include later amendments to or editions of the incorporated material. All material incorporated by reference may be examined at any state publications depository.

84.2 PURPOSE

The purpose of this regulation is to establish requirements, prohibitions, standards and concentration limits for the use of reclaimed water to protect public health and the environment while encouraging the use of reclaimed water.

84.3 SEVERABILITY

The provisions of this regulation are severable, and if any provisions or the application of the provisions to any circumstances is held invalid, the application of such provision to other circumstances, and the remainder of this regulation shall not be affected thereby.

84.4 APPLICABILITY

This regulation applies to the use of reclaimed water treated by centralized reclaimed water treatment systems and localized reclaimed water treatment systems for landscape irrigation, agricultural irrigation, fire protection, industrial, commercial, and toilet and urinal flushing uses identified in section 84.9 of this regulation. This regulation does not apply to wastewater that has been treated and released to state waters prior to subsequent use or to wastewater that has been treated and used at a domestic wastewater treatment plant site for landscape irrigation or process uses. This regulation applies to individual treaters and users, as defined below, upon the issuance of a notice of authorization pursuant to section 84.6(C) herein by the Water Quality Control Division.

84.5 DEFINITIONS

The following definitions shall apply:

- (1) Agricultural Irrigation means use of reclaimed water for the irrigation of crops and trees, excluding crops produced for direct human consumption, crops where lactating dairy animals forage, and trees that produce nuts or fruit intended for human consumption.

- (2) Agricultural Irrigation User means a person who uses reclaimed water for the purpose of agricultural irrigation.
- (3) Agronomic Rate means the rate of application of reclaimed water and associated nutrients to plants that is necessary to satisfy the plants' nutritional and watering requirements while strictly minimizing the amount of nutrients that run off to surface waters or which pass below the root zone of the plants.
- (4) Approved Cross Connection Control Device or Method has the same meaning as control device as defined in section 11.37(1)(c) of Regulation 5 CCR 1002-11 (Regulation #11).
- (5) Automated Vehicle Washing means the cleaning of vehicles and associated equipment, such as trailers, where automated equipment is used to apply spray water, cleaning products, and/or rinse water, where there is no public exposure to reclaimed water under normal operations and only limited and controlled contact with reclaimed water by trained workers.
- (6) Bag Filters means pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed of a non-rigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to the outside.
- (7) Cartridge Filters means pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed as rigid or semi-rigid, self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.
- (8) Centralized reclaimed water treatment system or Centralized System means a domestic wastewater treatment works that receives domestic wastewater from a diverse service area for treatment to produce reclaimed water for beneficial use where the service area has meaningful inputs from industrial or other diluting sources.
- (9) Certified Cross-Connection Control Technician has the same meaning as the term "certified cross-connection control technician" as defined in section 11.39(2)(h) of 5 CCR 1002-11 (Regulation #11).
- (10) Certified Operator has the same meaning as the term "certified operator" as defined in section 100.2(3) of Regulation 5 CCR 1003-2 (Regulation #100).
- (11) Commercial Laundry means a facility that uses water to clean clothing and other textile products where only laundry workers operate the washing machines and cleaning equipment, where there is no public exposure to reclaimed water under normal operations and only limited and controlled contact with reclaimed water by trained workers.
- (12) Commercial User means a person who uses reclaimed water in the operation of a business listed in Table A of section 84.8.
- (13) Conventional Filtration means a series of processes including coagulation, flocculation, sedimentation (or equivalent form of clarification), and granular media filtration.
- (14) Direct Filtration means a series of processes including coagulation and granular media filtration but excluding sedimentation.

- (15) Division means the Water Quality Control Division of the Colorado Department of Public Health and Environment.
- (16) Evaporative Industrial Processes means the use of water in an industrial process where the benefit of such use requires the evaporation of water, requiring additional make-up water, where there is no public exposure to reclaimed water under normal operations and only limited and controlled contact with reclaimed water by trained workers.
- (17) Fire Protection -- Nonresidential means firefighting activities where water is made available at fire hydrants located in areas other than residential, from fire trucks, and in fire sprinkler and interior standpipe systems in buildings in commercial/industrial areas.
- (18) Fire Protection – Residential means firefighting activities where water is made available at fire hydrants in residential areas, from fire trucks, and in fire sprinkler and interior standpipe systems at any structure where the occupants do not have access to the plumbing for maintenance and repair.
- (19) Industrial User means a person who uses reclaimed water for industrial processes or in the construction process. Approved industrial uses are listed in Table A of section 84.9.
- (20) Irrigation System means the facilities, piping and other equipment used by a Landscape Irrigation User or an Agricultural Irrigation User.
- (21) Landscape Irrigation means irrigation of areas of grass, trees, and other vegetation that are accessible to the public, including, but not limited to, parks, greenbelts, golf courses, and common areas at apartments, townhouses, commercial/business parks, and other similar complexes.
- (22) Landscape Irrigation User means a person who uses reclaimed water for the purpose of landscape irrigation.
- (23) Localized Reclaimed Water Treatment System or Localized System means a domestic wastewater treatment works that receives domestic wastewater from a single building, multiple buildings within a single property or area bounded by dedicated streets or ways, or a district designated by a City or County for treatment to produce reclaimed water for beneficial use where the source water does not have meaningful inputs from industrial or other diluting sources.
- (24) Manual Non-Public Vehicle Washing means the cleaning of vehicles and associated equipment, such as trailers, where any or all of the following are applied manually in the cleaning process: spray water, cleaning products, and/or rinse water; where there is no public access to the vehicle washing facility and only limited and controlled contact with reclaimed water by trained workers.
- (25) Membrane Filtration means a pressure or vacuum driven separation process in which particulate matter larger than 1 micrometer is rejected by an engineered barrier, primarily through a size-exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test. This definition includes the common membrane technologies of microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.
- (26) Non-Discharging Construction and Road Maintenance means the use of reclaimed water for nonpotable applications where water is required for cooling, wetting, dust suppression, or other construction and road maintenance activities, where there is no public exposure to reclaimed water under normal operations and only limited and controlled contact with reclaimed water by trained workers.

- (27) Non-Evaporative Industrial Processes means the use of water in an industrial process where water is not evaporated in the process and is used within a contained system, where there is no public exposure to reclaimed water under normal operations and only limited and controlled contact with reclaimed water by trained workers.
- (28) Person means an individual, corporation, partnership, association, state or political subdivision thereof, federal agency, state agency, municipality, commission, or interstate body.
- (29) Point of Compliance means a point identified by the treater in the reclaimed water treatment or transmission system after all treatment has been completed and prior to dilution and blending of water has occurred. If reclaimed water is used for indoor nonpotable uses within a building where plumbing fixtures are accessible by the general public, the “point of compliance” for disinfection residual is at the location where water is delivered to the occupied premises.
- (30) Potable Water has the same meaning as “Finished Water” as defined in section 11.3(32) of the Colorado Primary Drinking Water Regulations, 5 CCR 1002-11.
- (31) Reclaimed Water is domestic wastewater that has received secondary treatment by a domestic wastewater treatment works (centralized system or a localized system) and such additional treatment as to enable the wastewater to meet the standards for approved uses.
- (32) Resident-Controlled Landscape Irrigation means irrigation of areas of grass, trees and other vegetation located on the property of a single family or other residential occupancy where the occupant is the User and is responsible for the maintenance and/or operation of the irrigation system.
- (33) Restricted Access means controlled and limited access to the areas where reclaimed water meeting Category 1 standards, as defined in section 84.7, is used.
- (34) Secondary Treatment means the biological treatment of wastewater to meet BOD₅, total suspended solids (“TSS”); CBOD₅; and Oil and Grease numeric limitations in section 62.4 of Regulation #62.
- (35) Toilet and Urinal Flushing or Fixture Flushing means the use of reclaimed water to flush toilets and urinals only in multifamily residential structures or nonresidential structures where the toilet and urinal installations are conducted in accordance with and conform to Article 58 of Title 12 [Plumbers] and Rules promulgated to that Article.
- (36) Trained Worker means a person employed at the site where reclaimed water is used, who has been provided with the information specific to the additional conditions specified in section 84.9 that are applicable to that site’s approved use(s) of reclaimed water.
- (37) Transmission System means the treater’s facilities that transport treated reclaimed water between the treater and users.
- (38) Treater means a person who treats reclaimed water using a centralized reclaimed water treatment system or localized reclaimed water treatment system and provides reclaimed water to a user for the purpose of uses identified in section 84.9. A treater may also be a user.
- (39) Treatment Technique Requirement means a requirement that specifies a treatment technique(s) for a pathogen reduction target which results in a sufficient reduction in the level of the pathogen to comply with the requirements of Regulation #84.
- (40) Unrestricted Access means uncontrolled access to the areas where reclaimed water meeting the Category 2 standards, as defined in section 84.7, is used.

- (41) User means a person who uses reclaimed water for the purpose of uses identified in section 84.9. A user may also be a treater.
- (42) User Plan to Comply means the information and documentation a user is required to submit to the treater under section 84.11 of this regulation.
- (43) Washwater Applications means water used in washing of miscellaneous construction/maintenance equipment, as well as concrete washout, mineral processing, and other similar uses where reclaimed water is used to remove material from equipment or a desired product, where there is no public exposure to reclaimed water under normal operations and only limited and controlled contact with reclaimed water by trained workers.

84.6 ADMINISTRATION

(A) Letter of Intent.

Treaters shall submit a letter of intent to the Division and to the local health authority that shall include:

- (1) Treater information including name of entity; legally responsible person's name, address, telephone number, and email address; and for each facility owned and/or operated by the treater where domestic wastewater is treated for transmission, the facility contact person's name, address, telephone number, and email address (if different than legally responsible person).
- (2) Information demonstrating the treater's ability to comply with the applicable reclaimed water standards described in section 84.7 of this regulation and section 84.10 of this regulation (for localized reclaimed water treatment systems), including an 8.5" x 11" or 11" x 17" schematic of the treatment process showing the location of the proposed point(s) of compliance. Include the point of compliance for demonstration that secondary treatment has been attained which may be the same or different than the point where attainment of reclaimed water standards will be demonstrated. Include either: a copy of the site application approval letter and the approval letter for the reclaimed water treatment facility plans and specifications; or evidence of submittal of a site application and plans and specifications to the Division.
- (3) An analysis that demonstrates that reclaimed water used for landscape irrigation or agricultural irrigation will be applied at or below agronomic rates. Landscape irrigation and agricultural irrigation uses may also be subject to waste load allocations or limits as contained in a Total Maximum Daily Load (TMDL) or control regulation governing the watershed within which the irrigation occurs.
- (4) A reuse system management plan which includes: a description of the proposed reclaimed water treatment and transmission systems; a description of the treater's program to inform and educate users on the requirements of this regulation; a description of the treater's plan to oversee the use of reclaimed water by users to ensure, to the maximum extent practicable, that users attain and maintain compliance with this regulation; and evidence of the treater's legal ability (regulation, ordinance, contract, or other acceptable mechanism) to terminate service to a user if the user fails to comply with this regulation.
- (5) A certification statement as per section 84.15 of this regulation.
- (6) For each user, a user plan to comply developed in cooperation with the treater and meeting the requirements of section 84.11.

- (7) Affirmation that the reuse of this water by the treater will not materially injure water rights. For localized systems located within the service area of a water service provider, the letter of intent shall include an affirmation that the proposed installation of a localized system is allowed by the water service provider.
- (8) When reclaimed water is used for fire protection, the Letter of Intent shall also include a map indicating areas where reclaimed water is to be supplied for fire protection uses and identifying the fire protection authority(s) having jurisdiction. The Letter of Intent shall also include a letter from the fire protection authority(s) having jurisdiction indicating their approval of using reclaimed water for fire protection activities.
- (9) Where the land application of reclaimed water is subject to limitations on concentration and/or loading of nitrogen or phosphorus pursuant to a control regulation adopted by the Water Quality Control Commission, a statement as to whether the treater intends to have such limitations included in the notice of authorization issued under this regulation or under a permit issued pursuant to Regulation #61.
- (B) Field Verification and Commissioning Report and Inspection. For localized reclaimed water treatment systems, prior to supplying reclaimed water for use, the treater must verify that the system is operational and meets reliability requirements of the log removal targets in section 84.10(A)(2)(a) below. Following completion of field verification and commissioning, the treater shall provide the Division a field verification and commissioning report and an operations and monitoring plan. The field verification and commissioning report will confirm that the treatment system has been installed and is operating in accordance with the approved design criteria in section 84.10(A)(2)(a) below. The operations and monitoring plan will define the frequency and locations for monitoring, data storage, and reporting. The Division may conduct an inspection of the localized reclaimed water treatment system to confirm that the unit treatment processes have been installed in conformance with the approved design and are in operation in accordance with operations and monitoring plan.
- (C) Division Review. The Division will notify the treater in writing not more than thirty (30) calendar days after receipt of a letter of intent (for centralized reclaimed water treatment systems) or the letter of intent, field verification and commissioning report and operations and monitoring plan (for localized reclaimed water treatment systems), and if and in what respects, the letter of intent (for centralized reclaimed water treatment systems) or the letter of intent, field verification and commissioning report and operations and monitoring plan (for localized reclaimed water treatment systems) are incomplete. The review period may be extended by the Division. Where information provided by a user is incomplete, the treater may amend the Letter of Intent to address the deficiency or to remove that user from the letter of intent.
- (D) Issuance of Notices of Authorization. The Division shall either issue or deny the notice of authorization (NOA) within thirty (30) calendar days of its determination that the letter of intent (for centralized reclaimed water treatment systems) or the letter of intent, field verification and commissioning report, and operations and monitoring plan (for localized reclaimed water treatment systems) are complete. Upon the written agreement of the treater, the review period may be extended for a period mutually agreed to by the treater and the Division. The treater shall be notified in writing upon denial of the NOA of such action and the reason(s) for the denial. The Division shall issue a separate NOA to the treater and to each user. Treaters and users planning to use reclaimed water shall have or obtain a NOA from the Division prior to any use of reclaimed water.
- (E) Appeal of Issuance or Denial of NOA. The treater or user, or any other person potentially adversely affected or aggrieved by Division issuance or denial of a NOA, may submit a request, within thirty (30) days of the date of issuance or denial, to the Administrator of the Water Quality Control Commission ("Commission"), for a hearing.

- (1) Such hearing shall be conducted pursuant to the requirements of the Procedural Regulations for all Proceedings before the Commission and the Division, Regulation #21, 5 CCR 1002-21.
 - (2) The person requesting the hearing shall have the burden of proof in all hearings held pursuant to this section.
- (F) Terms and Conditions of NOAs. NOAs issued by the Division shall contain such terms, limitations, and conditions as are deemed necessary by the Division to ensure compliance with this regulation, except for those NOAs that contain a schedule of compliance as determined by the Division. At a minimum, all NOAs shall contain the following:
- (1) Treater information including name of entity; legally responsible person's name, address, telephone number, and email address; and for each facility owned and/or operated by the treater where domestic wastewater is treated for distribution, the facility contact person's name, address, telephone number, and email address (if different than legally responsible person). For the treater NOA, a list of approved users and their associated uses shall be included;
 - (2) Issuance date;
 - (3) The approved uses as defined in Table A of section 84.9, including the category of reclaimed water, and additional conditions for each approved use in subsection 84.9, the associated numeric limit for each use, and requirements from sections 84.7; 84.8, and for localized systems, 84.10;
 - (4) For User NOAs, the location(s) of use, a description of the approved use(s), and best management practices that meet the requirements of subsection 84.12, as applicable;
 - (5) A requirement that the treater implement its reuse system management plan that meets the requirements of subsection 84.6(A)(4) to ensure user compliance with this regulation. For User NOAs, include a requirement that the user comply with the user plan to comply;
 - (6) Where the treater has so requested in the Letter of Intent per Section 84.6(A)(9), conditions defining limitations for concentration and loading of nitrogen and/or phosphorus pursuant to a control regulation adopted by the Water Quality Control Commission.
 - (7) A requirement to submit information to the Division requesting the amendment of a Letter of Intent prior to making any of the following significant changes:
 - (a) Adding an additional user or deleting a user;
 - (b) When a treater proposes any significant physical or operational changes;
 - (c) If reclaimed water is used for irrigation, when there is a significant change in the agronomic rate analysis; and
 - (d) When any user governed by an existing NOA significantly modifies or changes its physical or operational use of reclaimed water, including, but not limited to, the addition of landscape area to be irrigated that is not contiguous to an existing approved area, addition of areas where reclaimed water is to be used for fire protection, addition of a new user or use in a new commercial or industrial process, or use in a new location.

Said request for amending the Letter of Intent shall be made at least thirty days prior to implementing a change described in subsections (a) or (c), above, and at least sixty days prior to implementing a change described by subsections (b) or (d), above.

- (8) Terms for modification, revocation, or termination;
- (9) Required monitoring, as is reasonably necessary, to be performed by the user;
- (10) Reporting and record keeping requirements;
- (11) Public access restrictions, if applicable; and
- (12) A statement of applicable civil and criminal penalties.

84.7 RECLAIMED WATER CATEGORIES AND STANDARDS

- (A) Category 1 Standards: Reclaimed water, for uses where Category 1 water is required, shall, at a minimum, receive secondary treatment with disinfection. The following reclaimed water standards shall apply at the point of compliance:

<u>Parameter</u>	<u>Limit</u>
<i>E. coli</i> /100 ml	126/100 ml monthly geometric mean and 235/100 ml single sample maximum.
Total Suspended Solids	30 mg/L as a daily maximum.

- (B) Category 2 Standards: Reclaimed water, for uses where Category 2 water is required, shall, at a minimum, receive secondary treatment with filtration and disinfection. The following reclaimed water standards shall apply at the point of compliance:

<u>Parameter</u>	<u>Limit</u>
<i>E. coli</i> /100 ml	126/100 ml monthly geometric mean and 235/100 ml single sample maximum.
Turbidity, NTU	Not to exceed 3 NTU as a monthly average and not to exceed 5 NTU in more than 5 percent of the individual analytical results during any calendar month.

- (C) Category 3 Standards: Reclaimed water for uses where Category 3 water is required shall, at a minimum, receive secondary treatment with filtration and disinfection. The following reclaimed water standards shall apply at the point of compliance:

<u>Parameter</u>	<u>Limit</u>
<i>E. coli</i> /100 ml	None detected in at least 75% of samples in a calendar month and 126/100 ml single sample maximum.
Turbidity, NTU	Not to exceed 3 NTU as a monthly average and not to exceed 5 NTU in more than 5 percent of the individual analytical results during any calendar month.

84.8 FILTRATION AND DISINFECTION REQUIREMENTS FOR USE OF RECLAIMED WATER PRODUCED FROM CENTRALIZED SYSTEMS

- (A) The treater must properly operate and maintain all required treatment systems when producing reclaimed water in accordance with this regulation, the NOA, and the site location and design approvals.
- (B) In addition to the factors to be considered and approved by the Division under Regulation #22, the following filtration and disinfection requirements apply to reclaimed water produced from centralized systems specifically for Category 3 uses of indoor toilet and urinal flushing. In the event of a conflict between Regulation #22 and the following filtration and disinfection requirements, the following requirements shall control over any conflicting filtration and disinfection requirements in Regulation #22:
 - (1) In addition to the requirements listed in 84.7(C), the treater must properly operate filtration and disinfection of secondary treated wastewater while producing reclaimed water that reliably achieves all of the following:
 - (a) Disinfection that provides a minimum of 99.999 (5-log) inactivation of enteric viruses by at least one of the following treatment techniques.
 - (i) For free chlorine or monochloramines, log inactivation of viruses to be determined as referenced in 5-CCR-1002-11 and defined by the USEPA for disinfection of surface water (Hepatitis A).
 - (ii) Minimum UV of 40 mJ/cm² using a validated reactor per the Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule (November 2006).
 - (b) Filtration by any one of the following treatment techniques:
 - (i) Conventional or direct filtration.
 - (ii) Membrane filtration accepted for use by the division in accordance with section 11.8 of 5 CCR 1002-11.(iii) Bag or cartridge filtration accepted for use by the division in accordance with section 11.8 of 5 CCR 1002-11.
 - (iv) Alternative filtration technologies accepted by the Division in accordance with Wastewater Design Criteria Alternative Technology Acceptance that is third party challenge tested to reliably remove 99.9% of challenge particles that are at most 3 micron diameter.
 - (c) The treater must return any recycled spent filter backwash water, thickener supernatant, or liquids from the dewatering process to a location within the treatment process that is before the filtration technology or an alternative Department-approved location.
 - (i) For conventional or direct filtration, the location of return must be prior to the coagulant feed location.(ii) For all other filtration technologies, the location of return must be prior to the filtration process and approved by the Division.

84.9 AUTHORIZED RECLAIMED WATER USES

Table A: Approved Uses of Reclaimed Water

Approved Uses	Category	Category	Category	Additional Conditions
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	1	2	3	Required 84.9(A)
INDUSTRIAL				
Evaporative Industrial Processes	Allowed	Allowed	Allowed	1
Washwater Applications	Not Allowed	Allowed	Allowed	2,3,7
Non-Discharging Construction and Road Maintenance	Allowed	Allowed	Allowed	3,7
Non-Evaporative Industrial Processes	Allowed	Allowed	Allowed	7
LANDSCAPE IRRIGATION				
Restricted Access	Allowed	Allowed	Allowed	
Unrestricted Access	Not Allowed	Allowed	Allowed	3,4
Resident-Controlled	Not Allowed	Not Allowed	Allowed	3,4,5
COMMERCIAL				
Zoo Operations	Allowed	Allowed	Allowed	
Commercial Laundries	Not Allowed	Allowed	Allowed	7
Automated Vehicle Washing	Not Allowed	Allowed	Allowed	3,8
Manual Non-Public Vehicle Washing	Not Allowed	Allowed	Allowed	3,8
FIRE PROTECTION				
Nonresidential Fire Protection	Not Allowed	Allowed	Allowed	6
Residential Fire Protection	Not Allowed	Not Allowed	Allowed	6
AGRICULTURAL IRRIGATION				
Non-Food Crop Irrigation and Silviculture	Allowed	Allowed	Allowed	3
TOILET AND URINAL FLUSHING				

Toilet and urinal flushing	Not Allowed	Not Allowed	Allowed	5, 9, 10, 11, 12
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(A) Additional Conditions Required. In addition to the conditions for use of reclaimed water listed in section 84.9, the Division will include the following best management practices in the NOA for the associated uses listed in Table A:

- (1) If there is a significant likelihood for aerosols to drift to public or worker areas, adequate signage is required. Supplemental disinfection and disinfectant residual and/or public access restrictions are required.
- (2) Washing activities must be contained (e.g., flow to lined pit or approved concrete washout area, or within enclosed equipment), as to prevent any off-site runoff or discharge to ground water. Workers shall be trained on the proper use and washing procedures when using reclaimed water.
- (3) Application rates or other measures shall be employed to minimize ponding on or runoff from the area approved for application or use.
- (4) No reclaimed water piping shall be extended to or supported from any residential structure and there shall be no accessible above grade outlets from the reclaimed water system at any residential structure. At least one exterior hose bib, supplied with potable water, shall be labeled and provided at each residential structure.
- (5) The treater shall develop and implement a public education program to inform residents, workers, plumbing contractors and inspectors who deal with the resident-controlled landscape irrigation systems, or toilet and urinal flushing systems about the need to: a) strictly prohibit cross-connections between the reclaimed water and potable water systems; b) clearly and distinctively identify the potable service lines and plumbing from the reclaimed water service lines and plumbing; and c) avoid contact with and strictly minimize ponding or runoff of the reclaimed water. The treater shall implement a cross-connection inspection program and shall have the authority to discontinue reclaimed water service to any resident or worker who flagrantly or repeatedly misuses reclaimed water in a manner inconsistent with this regulation. The treater shall maintain a map indicating all areas where reclaimed water is provided for resident-controlled landscape irrigation, or toilet and urinal flushing.
- (6) The user shall develop and implement a program, including notices in fire department newsletters and fire department preplans, to educate the public and firefighters that reclaimed water is used for fire protection. The user shall develop a program to educate plumbing and fire protection system contractors and inspectors expected to access the fire protection system about the need to confirm that cross-connections between the reclaimed water and potable water systems do not exist and about the requirement to clearly identify the potable and reclaimed water systems throughout the building. All personnel authorized to use the reclaimed water for fire protection shall be educated to avoid contact with and strictly minimize ponding or runoff of the reclaimed water during non-emergency testing or training. An annual cross-connection inspection shall be made at each structure to which reclaimed water piping is extended for fire protection to ensure that no cross-connection exists. The treater shall maintain a map indicating the location of all fire hydrants, sprinkler systems and standpipe systems provided with reclaimed water.
- (7) Where there is the reasonable potential for worker or public exposure to aerosols generated in the use, users of Category 1 Reclaimed Water (if allowed for the use per

Table A) or Category 2 Reclaimed Water shall employ measures to prevent the frequent exposure of workers and the public to aerosols generated in the use of reclaimed water. Measures shall include at least one of the following: minimum setback distance of 100 feet between the nearest source of aerosol generation and areas where workers or the public are normally present; physical barriers between aerosol sources and humans; personal protective equipment to prevent aerosol inhalation; functionally equivalent measures approved by a qualified individual (e.g., a certified industrial hygienist); or other means approved by the Division. Given the higher level of treatment provided for Category 3 Reclaimed Water, additional measures to address exposure of workers or the public to aerosols are not required.

- (8) Where there is the potential for worker or public exposure to aerosols generated in the use, users of Category 2 Reclaimed Water shall employ measures to prevent the inhalation of aerosols from reclaimed water by workers and the public. Measures shall include at least one of the following: personal protective equipment documented to prevent aerosol inhalation; or functionally equivalent measures approved by a qualified individual (e.g., a certified industrial hygienist) and documented to prevent aerosol inhalation.
- (9) Reclaimed water may be used for indoor uses provided that the user adopts and follows best management practices (BMPs) to minimize growth of and worker exposure to *Legionella* and other premise plumbing opportunistic pathogens. BMPs shall be specified in a site-specific operation and maintenance plan as described in section 84.11(C), and shall include at least one of the following:
 - (a) Maintenance of a minimum 0.2 mg/L of free chlorine disinfectant or 0.5 mg/L of monochloramine residual if ammonia is present in premise plumbing. The disinfection residual shall be measured at a location at a distance of no greater than 50 feet from the location of use at the distal end or a location that represents the oldest water age within the reclaimed water premise plumbing system. This may require chlorine “boosting” at the point that reclaimed water enters a structure. The monitoring frequency will be no less frequent than once (grab samples) per week. If the disinfectant residual is not in compliance with this requirement, the system must perform operations and maintenance and return all premise plumbing to a minimum 0.2 mg/L disinfection residual for free chlorine or 0.5 mg/L disinfection residual for monochloramine within 24 hours. Exact monitoring locations, and other compliance terms, will be identified in the site-specific operation and maintenance plan submitted as part of the user plan to comply. The system must maintain record of all sampling, locations, and corrective operations for review by the treater or division upon request.
 - (b) An alternative disinfection method as approved by the Division with equivalent protection against premise plumbing pathogens as set forth in section 84.9(A)(9)(a) above. The effectiveness of an alternative disinfection method may be verified by monitoring. The monitoring plan and any requirements for implementation of any Division approved alternative disinfection method must be included in the user plan to comply and the NOA.
 - (c) Where reclaimed water is used for indoor nonpotable uses within a building where plumbing fixtures are accessible by the general public, a monitoring location for disinfection residual at a distance no greater than 50 feet from the location of use at the distal end or a location that represents the oldest water age within the reclaimed water premise plumbing system may be used as an alternate point of compliance for disinfection residual.

84.10 RECLAIMED WATER TREATMENT REQUIREMENTS FOR LOCALIZED RECLAIMED WATER TREATMENT SYSTEMS

- (10) To minimize risk of unintended cross connections, plumbing modifications and repairs shall only be conducted by licensed plumbers. Signage shall indicate that plumbing modifications can only be done by authorized personnel. Signage shall be located where plumbing is accessible.
- (11) Users receiving reclaimed water for use within an occupied premise, must include a backup potable water connection capable of supplying potable water to fixtures for flushing via an air gap should the localized reclaimed water treatment system fail or the reclaimed water is found to be non-compliant or insufficient in volume.
- (12) Users may use reclaimed water for toilet and urinal flushing in multifamily residential structures and in nonresidential structures, only if the toilet and urinal installations are conducted in accordance with article 58 of title 12 [concerning plumbers] and rules promulgated pursuant to that article. Any toilet or urinal installation must conform to article 58 of title 12 and rules promulgated pursuant to that article.

84.10 RECLAIMED WATER TREATMENT REQUIREMENTS FOR LOCALIZED RECLAIMED WATER TREATMENT SYSTEMS

- (A) Reclaimed water treated by localized reclaimed water treatment systems must comply with the standards and requirements in this section 84.10.
- (B) The treater must properly operate and maintain all required treatment systems when producing reclaimed water in accordance with this regulation, the NOA, and the site location and design approvals. In addition to the factors to be considered and approved by the Division under Regulation #22, localized reclaimed water treatment systems are subject to the following additional design requirements for treatment.
 - (1) The treater must properly operate a multi-barrier treatment approach using filtration and disinfection following secondary treatment while producing reclaimed water that reliably achieves all of the logarithmic (“log”) reduction targets for pathogens set forth in Table B below. If a treater conducts its own microbial risk assessment, the treater may request approval from the Division to use alternative log reduction targets based upon the treater’s microbial risk assessment.
 - (a) Reclaimed water produced from localized systems for Category 1 uses must meet the design requirements based on a microbial risk assessment using a risk target no less stringent than 10⁻² infections per person per year only for Enteric Viruses as set forth in Table B below.
 - (b) Reclaimed water produced from localized systems for Category 2 uses must meet the design requirements based on a microbial risk assessment using a risk target no less stringent than 10⁻² infections per person per year as set forth in Table B below.
 - (c) Reclaimed water produced from localized systems for Category 3 uses must meet the design requirements based on a microbial risk assessment using a risk target no less stringent than 10⁻⁴ infections per person per year as set forth in Table B below.

Table B: Localized System Log Removal Targets for Treatment Design

	Enteric Viruses	Parasitic Protozoa	Enteric Bacteria
Log ₁₀ Reduction Target (10 ⁻²)	6.0	-	-

84.10 RECLAIMED WATER TREATMENT REQUIREMENTS FOR LOCALIZED RECLAIMED WATER TREATMENT SYSTEMS

Category 1			
Log ₁₀ Reduction Target (10 ⁻²) Category 2	6.0	5.0	4.0
Log ₁₀ Reduction Target (10 ⁻⁴) Category 3	8.5	7.0	6.0

- (2) The Division will develop policy defining credits for the log reduction of pathogens through various treatment processes.
- (3) The localized system design requirements will be based on the assumption that the wastewater does not receive meaningful inputs from industrial or other diluting sources.

(C) Localized System Monitoring Requirements:

- (1) Reclaimed water produced from localized systems must meet the standards for the category of reclaimed water in section 84.7 for the approved use. Compliance with the standards in section 84.7 shall be verified by the monitoring requirements in section 84.10(C)(2) and (3) below.
- (2) Localized reclaimed water treatment systems must be continuously monitored for appropriate process control parameters to demonstrate that systems designed to comply with pathogenic microorganism control are functioning properly. The choice of the type of continuous monitoring technologies to be utilized will be tailored for an individual system and will be included in an operations and monitoring plan. Examples of acceptable forms of continuous monitoring for localized system process control are identified in Table C below:

Table C: Acceptable Surrogate Parameters for Localized Systems

Surrogate Parameter	Surrogate Monitoring Point	Purpose
Chlorine residual	Post-chlorination at a representative location for treatment	Confirm control of opportunistic pathogens
Continuous turbidity or particle size distribution	Post-filtration at a representative location for treatment	Confirm operation of filtration system; can be an indicator of pathogen breakthrough
Pressure decay test	Membrane filtration unit	Measures membrane integrity
Electrical conductivity or tracer spike test; total organic carbon or UV absorbance (254 nanometers)	Reverse osmosis or nanofiltration unit	Can be related to pathogen breakthrough
Continuous color, ultraviolet light absorbance (UVA) or transmittance (UVT), and/or pH	Prior to disinfection or ozonation	Can indicate conditions that inhibit pathogen removal in disinfection or ozonation steps

Residual ozone, or oxidation-reduction potential	Ozonated water	Can be correlated to pathogen removal
Continuous ultraviolet (UV) intensity	UV-treated water	Confirm sufficient dose of UV for pathogen inactivation

- (3) The Division shall adopt a policy identifying other acceptable monitoring technologies for localized system treatment processes and means to approve additional monitoring techniques. The operations and monitoring plan shall include a tailored quality assurance plan specific to the continuous monitoring equipment in place. The quality assurance plan may include analysis of periodic grab samples for additional quality assurance of data collected via continuous monitoring, with parameters measured being consistent with those measured via continuous monitoring.
- (D) The treater must return any recycled spent filter backwash water, thickener supernatant, or liquids from the dewatering process to a location within the treatment process that is before the filtration technology or an alternative Department-approved location.
- (1) For conventional or direct filtration, the location of return must be prior to the coagulant feed location.
- (2) For all other filtration technologies, the location of return must be prior to the filtration process and approved by the Division.
- (E) Localized reclaimed water treatment systems shall include a flow meter on the localized reclaimed water treatment system and a flow meter on the potable make-up water pipeline to the distribution system.
- (F) Localized reclaimed water treatment systems must be equipped with features that result in a controlled and non-hazardous automatic shutdown of the process in the event of a malfunction. Localized reclaimed water treatment systems must maintain overflow connections to an approved and permitted domestic wastewater treatment works to allow for disposal of off-specification treated reclaimed water or to allow disposal of untreated wastewater during maintenance of the treatment system. Overflow connections will include an approved cross connection control device or method.
- (G) NOAs for use of reclaimed water from localized systems may include requirements for limitations on contributions from non-domestic sources as necessary to prevent pass through, interference, or impacts on public health or the environment from those sources.

84.11 USER PLAN TO COMPLY REQUIREMENTS

- (A) Landscape irrigation users and agricultural irrigation users shall include the following in a user plan to comply:
- (1) User information including name of entity; legally responsible person's name; address; telephone number; email address; and site address where reclaimed water will be used;
- (2) An 8.5" x 11" or an 11" x 17" map or schematic drawing indicating the specific area(s) where irrigation with reclaimed water will take place;
- (3) A description of the best management practices the user intends to implement to ensure that direct and windblown spray and other means of human exposure from irrigation

systems will be confined to the areas designated and approved in the notice of authorization;

- (4) Best management practices the user intends to employ to ensure that application rates shall be controlled to strictly minimize ponding and runoff and to minimize the amount of applied water and associated pollutants that pass through the root zone of the plants to be irrigated (e.g., rain shutoff devices, application at evapotranspiration rates adjusted for irrigation efficiency, daily inspections, or other means); and
 - (5) If applicable, information demonstrating how the user will restrict access to landscaped areas where Category 1 reclaimed water is to be applied either by:
 - (a) Irrigating only during periods approved in the notice of authorization so as to strictly minimize public contact with reclaimed water, or
 - (b) Installing barriers to prevent public access to the site, as approved in the NOA, restricting irrigation to times when the barriers are in place, and ceasing irrigation at least one hour prior to the barriers being totally or partially removed.
 - (6) For resident-controlled landscape irrigation, unless a homeowners' association or other entity acceptable to the Division assumes responsibility, the treater shall be responsible for all information required in the user plan to comply and shall act as the users' legal representative for purposes of certification pursuant to section 84.11(F) below.
- (B) Commercial, industrial, and fire protection users shall include the following in a user plan to comply:
- (1) User information including name of entity; legally responsible person's name; address; telephone number; email address; and site address where reclaimed water will be used;
 - (2) A description of how reclaimed water is to be used;
 - (3) An 8.5" x 11" or 11" x 17' map or schematic showing where such use will occur;
 - (4) The potential for public contact with reclaimed water used in the commercial or industrial operation(s) or process(es);
 - (5) The fate of waste water streams from the commercial or industrial operation or process after use (e.g., discharge to sanitary sewer, lined evaporation/recovery pond, subsequent permitted discharge, or other location);
 - (6) Best management practices the user intends to implement to prevent or minimize direct and windblown spray and other pathways of human exposure to reclaimed water;
 - (7) If applicable, information demonstrating how the user will restrict access to commercial or industrial areas, operations or processes where Category 1 reclaimed water is to be used; and
 - (8) Where reclaimed water is used to supply a fire sprinkler or standpipe system, information describing the user's cross-connection control, prevention and identification program that the user will implement to prevent any cross-connection between the reclaimed water and potable water systems.
- (C) Toilet and urinal flushing users shall include the following in a user plan to comply:

- (1) User information including name of entity; legally responsible person's name; address; telephone number; email address; and site address where reclaimed water will be used.
 - (2) A description of how reclaimed water is to be used.
 - (3) An 8.5" x 11" or 11" x 17' map or schematic showing water system and where use of reclaimed water will occur.
 - (4) Provide description of water systems/flow diagrams, including the potable, non-potable water, and wastewater systems within the building.
 - (5) The user plan to comply shall include an operation and maintenance plan. The operation and maintenance plan shall reflect current conditions, be kept on site, and be available for review by the Division upon request.
 - (6) Signage shall be located where plumbing is accessible, and state that plumbing modifications may only be conducted by licensed plumbers. Signage shall be no smaller than 8.5" x 11" or 11" x 17'.
 - (7) Reclaimed water shall not be used for indoor fixture flushing, if it is stored in an outdoor storage facility exposed to the open atmosphere after treatment.
 - (8) If the Division has approved an alternative disinfection approach as described in section 84.9(A)(9)(b), a user must include in the user plan to comply Division requirements under section 84.9(A)(9)(b) for implementation of alternative approaches for disinfection.
- (D) All users shall include information in their user plan to comply that demonstrates compliance with the following:
- (1) Use of reclaimed water shall be confined to the authorized use area, operation, or process.
 - (2) Precautions shall be taken to ensure that reclaimed water will not be sprayed on any facility or area not designated for application such as occupied buildings, domestic drinking water facilities, or facilities where food is being prepared for human consumption.
 - (3) Notification shall be provided to inform the public that reclaimed water is being used and is not safe for drinking. The notification shall include posting of signs of sufficient size to be clearly read in all use areas, around impoundments, and on tanks, tank trucks and other equipment used for storage or distribution of reclaimed water, with appropriate wording in the dominant language(s) expected to be spoken at the site.
 - (4) All new, modified, or replaced piping, valves, controllers, outlets, and other appurtenances, including irrigation systems and any equipment used for fire protection or in a commercial or industrial operation or process, shall be marked to differentiate reclaimed water from potable water or other piping systems.
 - (5) An approved cross connection control device or method shall be provided at all potable water service connections to reclaimed water use areas.
 - (6) Operation of the reclaimed water distribution or irrigation system, including valves, outlets, couplers, and sprinkler heads, and residential, commercial or industrial facilities and equipment utilizing reclaimed water, shall be performed only by personnel authorized by the user and trained in accordance with subsection 84.11(E)(11).

- (7) Supplementing reclaimed water with potable water by a user shall not be allowed except through an approved cross connection control device or method. Where an approved cross connection control device or method is used it must be tested on an annual basis by a Certified Cross-Connection Control Technician, unless there is a physical separation (e.g., removal of the connecting pipe, etc.) between the potable and reuse distribution systems. When potable water is used to supplement reclaimed water, the potable water provider must be notified.
 - (8) For indoor uses of reclaimed water, testing shall be completed to detect uncontrolled cross connections by a certified cross-connection control technician prior to initial operation of the system and at intervals thereafter as mandated in the NOA. The user must maintain a current diagram of the structure's potable, reclaimed water, and wastewater plumbing.
 - (9) Supplementing reclaimed water with other non-potable supplies shall not be allowed except through an approved cross connection control device or method. An approved cross connection device or method shall be provided at all service connections between reclaimed water and other non-potable water sources including but not limited to water from irrigation wells, industrial wells, or graywater.
 - (10) There shall be no impoundment or irrigation of reclaimed water within 100 feet of any well used for domestic supply unless:
 - (a) In the case of an impoundment, the impoundment is lined with a synthetic material with a permeability of 10⁻⁶ cm/sec or less; or
 - (b) In the case of irrigation, other precautions are implemented and included as a condition of the notice of authorization, to prevent contamination of the well.
 - (11) Workers shall be informed of the potential health hazards involved with contact or ingestion of reclaimed water and shall be educated regarding proper hygienic procedures to protect themselves.
 - (12) The additional conditions included in section 84.9, as applicable.
 - (13) For chlorine disinfection or alternative disinfection approaches approved under 84.9(A)(9), the user plan to comply shall identify the person responsible (e.g. user or treater) for monitoring disinfection at the point of compliance and operation and maintenance of the chlorine boosting system or the alternative disinfection method.
- (E) Users supplied by localized reclaimed water treatment systems shall include the following in a user plan to comply:
- (1) Protocol to switch to potable water and redirect reclaimed water to the sanitary sewer system no later than 12 hours after receipt of the results of any water quality test sample that does not meet the water quality requirements of the NOA or indication of a process malfunction based on continuous monitoring. Systems required to redirect reclaimed water to the sanitary sewer may resume normal operation after the Division receives a letter explaining why the performance was compromised and what actions were taken to prevent it from reoccurring, and three (3) consecutive days of data showing compliance, and the Division issues an approval to resume operations.
 - (2) An affidavit by the user attesting to the employment of a certified operator or a service contract with a certified operator, who meets the requirements of Regulation 100.

- (3) An enforceable legal agreement defining the roles and responsibilities of the user and treater.
 - (4) If required, the user shall identify the percentage contributions from each wastewater input to the localized system and the location of the input, and any limitations on contributions from non-domestic sources as necessary to prevent pass through, interference, or impacts on public health or the environment from those sources.
 - (5) All other requirements in section 84.11(A), (B), and (C) that apply to the use of reclaimed water from the localized system, as well as all requirements in 84.11(D).
- (F) Each user plan to comply shall include a statement signed by the user, or a legal representative of the user, that certifies:
- (1) The user has been provided a copy of this regulation and agrees to comply with the applicable requirements of this regulation, in particular the Conditions for Use of Reclaimed Water described in sections 84.8, 84.9, 84.10 and 84.11, the NOA and user plan to comply, and, if applicable, the access restrictions when Category 1 reclaimed water is used. The user shall submit a certification statement per section 84.15 of this regulation with the information provided in this item; and
 - (2) The user agrees to allow the treater or the Division reasonable access to the site to determine whether the user is in compliance with this regulation, the NOA and user plan to comply, and/or to perform monitoring and analysis as may be required in section 84.10(A)(3) for localized systems, and section 84.12.
 - (3) For indoor uses of reclaimed water, the user has had a certified cross-connection control technician complete a test to detect uncontrolled cross connections.

84.12 MONITORING, RECORD KEEPING AND REPORTING

- (A) Treaters and users operating pursuant to a notice of authorization shall be subject to such monitoring, record keeping, and reporting requirements as may be reasonably required by the Division to ensure compliance with the requirements of this regulation, and the NOA, including, but not limited to the following:
- (1) For treaters: the quality of reclaimed water produced and delivered at the point(s) of compliance, inspections of a representative number and type of user sites to determine user compliance, and self-certifications submitted to the treater by users.
 - (2) For each user, the total volume of reclaimed water used per year. For Landscape Irrigation Users and Agricultural Irrigation Users, each location with the associated acreage where reclaimed water was applied.
 - (3) For each user using Category 1 reclaimed water, confirmation that reclaimed water was used only during authorized use times (if applicable).
- (B) Treaters shall provide an annual report to the Division for the previous year, by March 31st, that includes the following:
- (1) Information demonstrating the treater's compliance with the reclaimed water standards, including applicable treatment requirements described in section 84.7, 84.8, 84.9 and for localized systems, 84.10 of this regulation.

- (2) Confirmation that the treater conducted inspections pursuant to section 84.12(A)(1) above.
 - (3) Violations of this regulation by users pursuant to section 84.12(C)(1), below.
 - (4) A certification statement by the treater as per section 84.15 below regarding the information provided by the treater in subsections (1) and (2) above.
 - (5) Information supplied by users to the treater demonstrating compliance with the conditions applicable to each specific user included in the notice of authorization.
 - (6) Certification statements from each user as per section 84.15 below regarding the information provided in subsection (5) above.
- (C) The treater and users shall report any violations as follows:
- (1) Violations of this regulation and/or notices of authorization at their respective facilities in writing to the Division, within thirty days of becoming aware of the violation. Where the treater finds violations by a user, the thirty day period for reporting is waived for a period of up to thirty additional days, if the treater is working with the user to resolve the violation. If the violation is resolved, no separate notice to the Division is required except that the violation is to be reported in the treater's annual report. If the violation is continuing after a total of sixty days from the time the treater became aware of the violation, the treater shall report the violation to the Division within five working days. Nothing in this section precludes a user from reporting violations by a treater to the Division.
 - (2) For more serious violations (including non-permitted discharges to surface waters, uncontrolled cross-connections, exceedances of the reclaimed water standards for E. coli, turbidity, secondary standards, continuous proper operations and maintenance of treatment systems while producing reclaimed water, the NOA, conditions of the site location and design approvals, or other violations posing an immediate threat to public health or the environment): orally to the Division within 24 hours of becoming aware of the violation, followed up by a written report within five working days. The written report shall contain a description of the noncompliance, including exact dates and times; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

84.13 VARIANCES

The Division may grant a variance from any provision of this regulation, except that with respect to the E.coli standards in section 84.7, a variance may only be granted from the "235/100 ml single sample maximum" standard. The Division may grant a variance in a particular case where the treater or the user demonstrates that the benefits to public health or the environment that will be created by compliance with the subject provision do not bear a reasonable relationship to the costs required to achieve compliance.

84.14 ENFORCEMENT

Violations of this regulation by treaters and users shall be subject to enforcement by the Division pursuant to Part 6 of the CWQCA. A treater shall not be subject to enforcement for a violation by a user; a user shall be solely responsible for its compliance with the terms and conditions imposed upon users. However, if the treater was aware of a violation by a user and did not report it as required in subsection 84.12(C), the treater may be subject to an enforcement action for failure to report the violation. A user shall not be subject to enforcement for a violation by a treater; a treater shall be solely responsible for its compliance with the terms and conditions imposed upon treaters. However, if a user was aware of the

violation and did not report it as required in subsection 84.12(C), the user may be subject to an enforcement action for failure to report the violation.

84.15 CERTIFICATION

Persons who are required to make submittals pursuant to subsections 84.6(A)(5), 84.11(F), and 84.12(B)(6) of this regulation, shall include the following certification statement:

"I certify, under penalty of law, that the information I am providing in this submittal is true, accurate, and correct. This determination has been made under my direction and supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

84.16 - 84.20 Reserved

84.21 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY, AND PURPOSE

The provisions of sections 25-8-205(1) and 25-8-308(1)(h) C.R.S., provide the specific statutory authority for the Reclaimed Domestic Wastewater Reuse Control Regulation adopted by the Commission. The Commission has also adopted, in compliance with section 24-4-203(4), C.R.S., the following statement of basis, specific statutory authority, and purpose.

BASIS AND PURPOSE

A. Background

In March of 1998 the Commission requested that a subcommittee of the Water Quality Forum be convened to consider potential statutory changes to the Colorado Water Quality Control Act ("Act") to address reuse of reclaimed domestic wastewater for landscape irrigation. The joint reuse committee of the American Waterworks Association and the Water Environment Association ("AWWA/WEA") suggested this approach to the Commission in a February 1998 presentation.

In the fall of 1999 the Forum subcommittee made a recommendation that the Colorado Water Quality Control Act be amended to provide the Commission with the authority to promulgate control regulations for the oversight of reuse and to provide the Division with the authority to implement a reuse program. In March of 2000 the general assembly adopted changes to the Act consistent with the subcommittee's recommendations and those changes became effective on July 1, 2000. The subcommittee had been concurrently working on a proposed control regulation that is patterned after the Commission's Biosolids Regulation.

B. Regulatory System Overview

It is the intent of the Commission that this regulation further promote reuse of reclaimed domestic wastewater by providing a comprehensive framework which, when followed, will assure responsible management of operations and a product of a quality compatible with the state's goals of protecting the public health and the environment. The Commission concludes that the provisions of this regulation are economically reasonable considering the economic, environmental and public health costs and impacts of the program.

The Commission, in adopting these regulatory provisions, has limited the scope of the regulation to reuse of reclaimed domestic wastewater for landscape irrigation. The statutory changes do not, on their face, appear to limit the adoption of control regulations to this type of reuse. However, the Commission finds that it is appropriate to limit the scope of the regulation to this aspect of reuse based on the AWWA/WEA recommendation that landscape irrigation should be addressed first

as the vast majority of reclaimed domestic wastewater in Colorado is used for this purpose. The Commission will consider regulatory proposals for other types of reuse, such as industrial and agricultural, in future rulemaking hearings where recommendations from a broad spectrum of interests are brought forward. This regulation is not intended for single family residential areas, unless the landscape irrigation areas are commonly owned or otherwise subject to reasonable controls by a neighborhood association to assure application is consistent with the "Conditions for Application" requirements.

The Commission has adopted provisions for the application of reclaimed domestic wastewater at "agronomic rates" with the intent that, once conforming changes are made to the Colorado Discharge Permit System ("CDPS") Regulations, reuse of reclaimed domestic wastewater in accordance with the provisions of this regulation will not be required to obtain a CDPS ground water discharge permit. The Commission does not intend that these regulations be used to limit flexibility to apply additional nutrients to landscaping being irrigated with reclaimed domestic wastewater. The Commission does expect that treaters will, as part of their overall program, inform applicators of the nutrient content of the reclaimed domestic wastewater.

The Commission has found that the use of an approach similar to that defined in the Biosolids Regulation will provide the appropriate level of oversight of reuse operations yet will not unduly burden the entities that are treating and applying reclaimed domestic wastewater to landscape.

The Commission expects that the amount of available information both on the health effects of reclaimed domestic wastewater and on the monitoring of pathogens will increase over the next several years. As a result, the Commission anticipates that the standards may be adjusted as new information becomes available. In the triennial review of this regulation, the Commission will consider any new information that is brought to it concerning pathogenic microorganisms and indicators of the presence or absence of such microorganisms in reclaimed domestic wastewater.

C. Letters of Intent

In order to facilitate the use of reclaimed domestic wastewater the "treater" is required to submit a Letter of Intent for each "applicator" to which it will be supplying reclaimed domestic wastewater. This will add a marginal burden to the treater, the entity that is most knowledgeable of the operational and regulatory requirements of the regulation, and will facilitate the responsible use of reclaimed domestic wastewater by entities that are interested in obtaining a viable product. At the same time, the Commission recognizes that the applicator must take responsibility for the proper use of reclaimed domestic wastewater by requiring the applicator to acknowledge receipt of the regulation and their intent to comply therewith. The treater must submit a description of an educational program that, in combination with a proposed plan to oversee the applicator's operation, will provide reasonable assurance of compliance.

The Commission has allowed existing treatment and land application facilities until December 31, 2001, to submit Letters of Intent as they will continue to be regulated under an existing discharge permit. This will give these systems ample time to obtain the required information from their applicators and to develop any additional information on their own facilities. New operations are required to submit Letters of Intent at least 30 days prior to the use of reclaimed domestic wastewater for landscape irrigation. This difference in timing is appropriate as existing facilities have been operating under a different set of regulatory requirements while new operators will be made aware of the requirements of these regulations through the site application approval process for domestic wastewater treatment works.

The Commission has established a 30-day period during which the Division must notify the applicant if the Letter of Intent is incomplete. This period is long enough to allow the Division to complete its review of the application and will not unreasonably delay approval of new systems or the addition of new applicators to existing systems.

D. Notices of Authorization

The Division has an additional 30 days from the time that the Letter of Intent is determined to be complete to issue the Notice of Authorization. This Commission finds this to be reasonable amount of time as the treater will have already received approval of the site application for the treatment facilities such that a substantial amount of information regarding the system will have already been provided to the Division. The Commission has required a Notice of Authorization to be issued to the treater and each applicator as a means of ensuring that the burden of compliance with the regulations is fairly distributed between the entity providing the reclaimed domestic wastewater and the entity that is putting that water to use.

The Commission has provided the opportunity for the treater, an applicator, or any other aggrieved party to appeal the Division's decision to issue or deny a Notice of Authorization in accordance with the Commission's procedural regulations.

The Commission has not limited the effective period of the Notice of Authorization since changes other than the addition or removal of applicators are expected to be relatively infrequent. This will reduce the burden that renewing Notices of Authorization would have on both the treater/applicator and the Division.

Notices of Authorization will include appropriate monitoring and reporting requirements, reclaimed domestic wastewater standards, and other necessary conditions to ensure the protection of the environment and public health.

E. Reclaimed Domestic Wastewater Standards**Treatment Requirements and Technology-Based Limits**

The public health risk of contracting disease from pathogenic microorganisms via exposure to reclaimed domestic water is mitigated by treating wastewater so as to minimize the number of viable pathogenic microorganisms: bacteria, viruses and protozoans. Acceptable public health risk is determined based on an absence of acute gastrointestinal disorders [the most likely type of disease manifestation] in those persons casually exposed to reclaimed domestic wastewater as it is used for surface irrigation of landscaping. Bacterial protection is ensured through the imposition of limits on E.coli , a surrogate organism for determining the potential presence of bacterial pathogens. Viral and protozoan (meaning specifically enteroviruses, and giardia/cryptosporidia parasites) protection is ensured by the imposition of limits for turbidity or total suspended solids, as appropriate.

The Commission has determined that, for unrestricted use of reclaimed domestic wastewater, which has a higher level of public contact, an additional barrier is appropriate to ensure the physical removal of pathogenic organisms that may potentially be present in the wastewater. Therefore, filtration, with associated turbidity limits to ensure the proper operation of the filtration facilities, is required for treaters practicing unrestricted use. Dilution after the filtration process will not provide a positive barrier to pathogenic organisms and is not allowed to be used as a means of complying with limits unless a variance has been obtained. Restricted use, with its much lower potential for public contact, will not require filtration; however, total suspended solids limits consistent with a well-operated secondary treatment system will be required.

Selection of turbidity as a surrogate measure of microbial purity for reclaimed domestic water is valid as an inexpensive means of determining microbial purity with regard to viruses and parasites. There is an absence of data to absolutely define a turbidity at or below which viruses will be absent. Actual turbidity vis-a-vis virus density data illustrate that, when combined with adequate disinfection, an absence of virus plaque forming units can be achieved up to turbidity levels of six NTU (nephelometric turbidity units). (D'Angelo, et al. Pilot Testing to Evaluate Virus

Removal and Deactivation , Proceedings of the 1984 Specialty Conference on Environmental Engineering, ASCE/Los Angeles, California, June 25-27, 1984). Similarly, from 1984 to 1991, comprehensive virus testing by Dr. Gerba at the University of Arizona recovered only one plaque forming unit (virus) from the Tucson Water Department's recycled water facility which was operating with a five NTU limit with an actual turbidity averaging between 3.5 and 4.0 NTU. In addition, there are four turbidity levels used among several states that permit the use of reclaimed domestic wastewater for irrigation. A two NTU limit is used in California, Missouri, and Oregon, a three NTU limit is used in Nevada and Texas (30-day average in TX, only), and a five NTU limit is used in Tucson, Arizona. In some cases concomitant virus and parasite (specifically Ascaris lumbricoides) monitoring is required; in other cases virus or parasite monitoring is required with no attention paid to turbidity; and in one case total suspended solids limits are used instead of turbidity limits. There is no consensus among the several states as to the appropriate turbidity limit. Accordingly, the Commission has selected a middle ground for unrestricted use application of reclaimed domestic wastewater. For these systems, calendar-month-average and maximum limits will be set at three NTU and five NTU (not to be exceeded in more than 5% of samples), respectively. No turbidity limits are required for restricted use sites, however, a total suspended solids limit of 30 mg/l is required as a daily maximum. This is deemed a somewhat conservative health risk-based standard given the low potential for contact with reclaimed domestic wastewater in this circumstance. This standard is technologically achievable and the Commission finds it to be appropriate to maintain public confidence in reclaimed domestic wastewater.

Indicator Organism and Limits

The Commission finds that E.coli is the appropriate surrogate indicator organism for determining the potential presence of bacterial pathogens in reclaimed domestic wastewater. The use of E. coli is appropriate primarily based on contemporary research presented in EPA documents summarizing the scientific studies. The most recent scientific data is contained in EPA 440/5-84-002 (Ambient Water Quality Criteria for Bacteria – 1986), and Dufour's USEPA study (Dufour, A.P., 1984, Health effects criteria for fresh recreational waters: EPA 600/1-84-004). The evidence demonstrates that E.coli is the best possible indicator organism because the ratio between pathogens of fecal origin to indicator organisms is most valid for E.coli .Furthermore, E.coli does not regrow once it is released into the ambient environment, where it only survives for about 110 hours.

This is similar to pathogen survival. These criteria do not hold for the traditional indicator organisms such as total and fecal coliforms. (Cabelli, V.J., 1982, Microbial Indicator Systems for Assessing Water Quality, Antonie van Leeuwenhoek, 48:613). In August 1998 US EPA's Office of Science and Technology, on the advice of 14 experts, strongly agreed that E.coli was the only appropriate indicator of fecal contamination.

E. coli also more closely meets and fulfills the traditional and long standing requirements of a surrogate indicator organism for pathogens. These criteria are that an indicator must be a biotype that is prevalent in sewage and excreted by humans and warm blooded animals. It should be present in greater abundance than pathogenic bacteria and the indicator should not be readily capable of proliferation. Ideally the indicator will be more resistant to disinfectants than pathogenic bacteria but will otherwise have a similar ambient survival time with them; and, the indicator should be quantifiable by simple, inexpensive, and rapid laboratory procedures. (Kott, Y., Current Concepts of Indicator Bacteria, BACTERIAL INDICATORS/HEALTH HAZARDS ASSOCIATED WITH WATER, ASTM STP 635, A. W. Hoadley and B. J. Dutka, Eds. American Society for Testing and Materials, 1977, pp 3-13.) E. coli satisfies more of these than any other indicator microorganism recommended by health professionals for fresh water.

There are few epidemiological studies that evaluate the risk of contact with reclaimed domestic wastewater. The Commission has set the limits for E. coli at a level equivalent to that recommended by EPA for swimming beaches in Ambient Water Quality Criteria for Bacteria – 1996 which recently was reaffirmed by EPA in Draft Implementation Guidance for Ambient Water

Quality Criteria for Bacteria 1996 (January 2000) . While these uses do not directly correlate, the Commission has found this to be an acceptable level of risk particularly when considering that, in establishing the limit for swim beaches, it was assumed that 100 ml of water was ingested. It is reasonable to expect that criteria established to protect swimmers will be more protective of individuals casually exposed to irrigation spray of reclaimed domestic wastewater.

F. Additional Conditions

The Commission is establishing a number of conditions for the application of reclaimed domestic wastewater that are intended to provide additional assurance that the health of the public will be protected by minimizing exposure to pathogenic organisms and that runoff from reuse sites will not leave the application site or enter state waters in appreciable amounts. In response to concerns raised regarding how the restricted use conditions of the regulation may be applied to use of reclaimed domestic wastewater for irrigation of golf courses, the Commission anticipates that golf course irrigation that occurs before and after normal operating hours on golf courses that restrict public access during such times will typically satisfy the requirements of subsection 84.8(A) of the regulation.

G. Monitoring and Reporting

The Commission finds that compliance oversight of the applicators should be shared by both the Division and the treater. The treater, based on its relationship with the applicator, is in a better position to oversee the operations of the applicator and can generally resolve violations without Division intervention as part of their routine program activities. If these efforts fail to return the applicator to compliance, then the Division will assume the lead role in the compliance oversight efforts.

Due to the limited part of the year during which irrigation takes place, the Commission finds that it is appropriate to limit the submittal of reported information to an annual report. The annual report must include the confirmation that the treater conducted inspections at a representative number of applicator sites as part of the treater's overall compliance assurance program.

H. Variances

The Commission is establishing a provision for variances from any aspect of the regulation but notes that the burden is on the treater to demonstrate that compliance with the regulations is unreasonable in light of the costs to comply.

The Commission recognizes that several reclaimed domestic wastewater systems were constructed and operated prior to the adoption of this regulation. This regulation is not intended to force existing systems to make capital improvements solely for assuring standardization if they accomplish the objectives of this regulation.

PARTIES TO THE RULEMAKING HEARING

1. Spring Valley Sanitation District
2. The City of Thornton
3. The City and County of Denver, Board of Water Commissioners
4. The City of Westminster
5. Roxborough Park Metropolitan District

6. Plum Creek Wastewater Authority
7. The City of Broomfield
8. The Farmers Reservoir and Irrigation Company
9. Colorado Water Conservation District
10. Colorado Springs Utilities
11. The Town of Hotchkiss
12. Spring Valley Development, Inc.
13. The City of Aurora
14. Chatfield Watershed Authority
15. The City of Blackhawk
16. Public Service Company of Colorado

84.22 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY, AND PURPOSE (April 2004 Hearing)

The provisions of sections 25-8-205(1) and 25-8-308(1)(h) C.R.S. provide the specific statutory authority for adoption of amendments to the Reclaimed Domestic Wastewater Reuse Control Regulation. The Commission also adopted, in compliance with section 24-4-203(4), C.R.S., the following statement of basis and purpose.

Basis and Purpose

When the Commission adopted Regulation 84 in October 2000, it limited its scope to use of reclaimed domestic wastewater for landscape irrigation. On October 8, 2003, the Water Quality Control Division and the Joint Water Reuse Committee of the Rocky Mountain Section American Water Works Association and Rocky Mountain Water Environment Association (“RMSAWWA/RMWEA”) requested that the Commission review Regulation 84 for the purpose of considering industrial and commercial uses of reclaimed domestic wastewater. On April 12, 2004, the Commission held a rulemaking hearing during which several modifications and additions to the regulation were adopted. The Commission modified section 84.4 of the regulation to clarify that reuse of reclaimed wastewater for the uses identified in section 84.8 of the regulation is prohibited except where authorized pursuant to a Notice of Authorization. This change was made to clarify the Commission’s intent that regulation 84 does not preclude the Division from authorizing uses of reclaimed wastewater that fall outside of the current scope of Regulation 84, where the Division is legally authorized to do so.

As a result of this rulemaking, the Commission amended Regulation 84 to further promote the use of reclaimed domestic wastewater, by allowing such water to be used in industrial and commercial applications as well as landscape irrigation. The Commission finds that the industrial and commercial uses contemplated by these amendments will create no greater risk to public health or the environment than the landscape irrigation uses authorized before the amendments.

The regulation, as amended, provides a framework that assures these additional uses are consistent with the Commission’s goals of protecting the public health and the environment, by requiring reclaimed domestic wastewater to meet minimum standards, and requiring treaters and users of such water to employ appropriate best management practices and oversee its use.

The Commission adopted provisions requiring treaters to provide the Division with a "User Plan to Comply" for each user, prior to receiving authorization to provide reclaimed domestic wastewater. The plan shall describe the intended use and the best management practices the user will employ, and demonstrate how these practices ensure the proposed landscape irrigation, industrial or commercial use will be protective of public health and the environment.

The Commission also revised the regulation for clarity by renumbering sections, revising language, and reorganizing the regulation.

The Commission concludes that the amendments to this regulation are economically reasonable considering the economic, environmental, and public health costs and impacts of the reuse program.

Section 84.2 was modified to clarify the Commission's intent that the regulations protect the environment as well as public health. Section 84.4 was revised to expand Regulation 84's applicability for reclaimed domestic wastewater and to remove obsolete references. Section 84.4 was also revised to replace the term "direct reuse" with "reuse," as the exceptions provisions in section 84.4 already exempt waters discharged to state waters from coverage under Regulation 84. Language was also added to section 84.4 to clarify that treaters and landscape irrigation users who are operating under already existing Notices of Authorization do not need to resubmit Letters of Intent upon promulgation of these regulatory amendments. The Division will issue amended Notices of Authorization to the existing treaters and landscape irrigation users as routine amendments are made to their user information and Letters of Intent, or by June 30, 2006, whichever comes first. However, treaters and users who had implemented programs for use of reclaimed water prior to the effective date of the regulation for any use other than landscape irrigation must submit new Letters of Intent for such use(s) to the Division no later than August 31, 2004.

The Commission adopted amendments adding, deleting, and modifying definitions used in Regulation 84. The following definitions were modified or deleted to increase clarity or to achieve consistency with other revisions: "Point of Compliance," "Reclaimed Domestic Wastewater," "Restricted Use," and "Treater." The definition of "Direct Reuse" was deleted consistent with the change to section 84.4 noted above. The definition for "Applicator" was deleted and replaced with a more generic definition of "User" to include all types of users of reclaimed domestic wastewater. The following definitions were added: "Commercial User" describes a new type of user; "Industrial User" describes a new type of user; "Irrigation System" reduces confusion by differentiating between a user's irrigation system and a treater's treatment and transmission facilities; "Landscape Irrigation User" aids in differentiating between types of users; "Restricted Access" is used in place of "restricted use" for clarity; "Transmission System" reduces confusion by differentiating between a treater's facilities and a user's irrigation system; "Unrestricted Access" is used in place of "Unrestricted Use" for clarity; "User" describes the characteristics of users; and "User Plan to Comply" refers to the plan a user is required to submit to show compliance with Regulation 84.

The Commission reorganized and edited section 84.6(a) [formerly 84.5(A)] regarding letters of intent, for clarity, completeness, and consistency with other revisions. Treaters must still submit a Letter of Intent to the Division, but the Letter of Intent requirements differ, depending on the intended uses for the reclaimed domestic wastewater. In addition, the Commission recognizes that to facilitate new or expanded uses for reclaimed domestic wastewater and timely approval of projects, the Division must have some flexibility in administering the Letter of Intent process. For instance, the revisions would allow a treater to submit a Letter of Intent concurrently with a pending site application and/or facility plans and specifications.

The Commission amended subsection 84.6(A)(3) [formerly 84.5(A)(3)], to clarify that treaters are required to provide information demonstrating that reclaimed domestic wastewater applied to landscapes by landscape irrigation users will be applied at or below agronomic rates or, where application at agronomic rates is not or will not be achieved, that land application is being done pursuant to a CDPS permit. The Commission is aware that some entities may have been land applying in excess of agronomic rates, and that they have incorporated the return rates to ground water into their discharge permits and into augmentation plans. The Commission adopted this change to provide flexibility to entities practicing

landscape irrigation so that they can maintain their current application practice, and associated credits under their augmentation plan, while applying reclaimed water in excess of agronomic rates pursuant to a CDPS permit. The Commission added language indicating that land application may also be subject to waste load allocations or limits as contained in a TMDL or control regulation governing the watershed within which the land application occurs, to clarify that Regulation 84 acts in tandem with these regulatory requirements. The agronomic application rate requirement does not apply to commercial and industrial users.

The Commission reorganized subsection 84.6(A)(6) [formerly 84.5(A)(6)] by moving existing requirements for users into modified sections 84.9 and 84.10, which contain the required content of a “User Plan to Comply” for each different type of use. The purpose of the User Plan to Comply is to provide the Division with information from each user that demonstrates that the proposed landscape irrigation, industrial or commercial use will be protective of public health and the environment.

The Commission amended subsection 84.6(A)(7) [formerly 84.5(A)(7)] to simplify the Letter of Intent process while, at the same time, fulfilling the Commission’s responsibility under C.R.S. 25-8-104 to determine if any decision it makes has the potential to cause material injury to water rights.

The Commission moved the requirement that a treater must update and modify its Letter of Intent under certain circumstances to subsection 84.6(E)(7) [formerly 84.5(A)(8)] under Terms and Conditions of Notices of Authorization. The Commission inserted a requirement for the treater to include a letter from the fire protection authority indicating its approval for use of reclaimed domestic wastewater for fire protection activities. This requirement assures that the fire protection authority has been solicited. This section 84.6(E) [formerly 84.5(E)] regarding Notices of Authorizations was revised for clarity, completeness, and consistency with other revisions.

In this rulemaking, the Commission established category-based standards for reclaimed domestic wastewater quality in section 84.7 [formerly 84.6]. Category 1 standards apply to water previously designated for “restricted use,” and Category 2 standards apply to water previously designated for “unrestricted use.” The category framework allows the Commission to identify with more precision the appropriate uses for various qualities of reclaimed domestic wastewaters, while the terms “restricted use” and “unrestricted use” were found to be incompatible with the diverse industrial and commercial settings where reclaimed domestic wastewater is now authorized to be used. The category-based framework also will facilitate the Commission’s future review of proposed uses for reclaimed domestic wastewater that may require different water quality.

The Commission found no reason to reassess the treatment standards adopted for reclaimed domestic wastewater. The Commission, in the 2000 rulemaking, found those standards to be appropriate for the use of reclaimed domestic wastewater for landscape irrigation and the Commission finds them to be sufficiently protective of public health and the environment for the additional approved industrial and commercial uses when best management practices are employed.

The Commission modified the treatment requirements for reclaimed domestic wastewater by replacing the term “oxidized” with “secondary treatment.” Secondary treatment is generally accepted in the wastewater industry to mean that wastewater has been biologically treated to remove at least 85% of BOD and total suspended solids.

The Commission established a new section 84.8 to identify different approved uses for reclaimed domestic wastewater. A table is provided detailing the landscape irrigation, industrial and commercial uses approved by the Commission if such use is conducted in accordance with a Notice of Authorization under Regulation 84. Each new use is addressed below:

Cooling Tower: The Commission approved the use of reclaimed domestic wastewater in cooling towers, based on findings that indicate the quality of the source (make-up) water used in cooling towers is not of great concern. When best management practices typically applied at cooling towers are employed, the quality of the source water does not increase any risk to public health or the environment. Cooling towers

are not accessible to the public and are maintained in a fashion that the water quality inside the cooling tower is controlled to standards that protect human health, regardless of the make-up water quality.

Concrete Mixing and Washout: The Commission approved the use of Category 1 reclaimed domestic wastewater in concrete batching processes where the water is mechanically dispensed into the truck mixer drum through a metal chute. This use of reclaimed domestic wastewater is protective of public health and the environment due to the fact that the water is dispensed by computer operated equipment, preventing worker contact, and the high pH of batched concrete would not allow the growth of microorganisms. Additionally, the water is entrained in the concrete and, therefore, is not discharged to surface or groundwater. Due to the potential for public and worker exposure, Category 1 reclaimed domestic wastewater may not be used for purposes other than mixing of the concrete. The Commission approved using Category 2 reclaimed domestic wastewater for batching concrete, for truck wash-down purposes at the plant, as an on-truck water supply to use for maintaining and adjusting concrete slump, and for wash-out purposes at the site. The Commission realizes that when proper BMPs are implemented, this use is protective of public health and the environment.

Dust Control/Soil Compaction/Mechanized Street Sweeping: The Commission approved the use of reclaimed domestic wastewater to wet down or pre-water work surfaces, for construction and demolition activities, sandblasting, soil compaction, and mechanized street washing. Approval is conditional on the user demonstrating that the application rate for these uses will not result in ponding or runoff into waters of the state, and that off-property transport of airborne particulate matter will be minimized. These uses are deemed protective of public health and the environment because the potential for public exposure for these activities when best management practices are implemented is minimal.

Closed Loop Cooling System: The Commission approved the use of reclaimed domestic wastewater in closed loop cooling systems where water circulates only within a contained system. This use results in no public exposure to reclaimed domestic wastewater, and only very limited and controlled contact by workers. Environmental risk from this use is also minimal when proper treatment and best management practices associated with the cooling processes are employed. Allowing the use pursuant to the best management practices, including discharging wastewater from the cooling process to the sanitary sewer system or other approved disposal mechanism, required by the regulation creates no greater risk to public health and the environment than using potable water in the cooling system.

Zoo Operations: The Commission approved the use of reclaimed domestic wastewater in zoo operations, including the care of captive animals. The Animal and Plant Health Inspection Service of the U.S. Department of Agriculture enforces the Animal Welfare Act, which governs the humane care and treatment of warm blooded and marine animals held in zoos. These entities must be licensed to operate, and must comply with the care and treatment standards provided by federal law. Category 2 reclaimed domestic wastewater meets or exceeds the water quality standards for zoo animals provided by federal law. Environmental and public health risk from this use is also minimal when proper best management practices associated with zoo management practices are employed. Such practices include discharging animal wastewater to the sanitary sewer system or other approved disposal mechanism, limited public access to water used for animal holding areas and habitat wash-down.

Fire Protection: The Commission determined that providing fire protection (interior sprinkler and exterior hydrants) with reclaimed water meeting Category 2 standards for commercial/industrial buildings is protective of public health when appropriate best management practices are implemented. The exposure to reclaimed water by building occupants during a fire is expected to be of short or no duration. This, coupled with the quality of Category 2 water, will not present a significantly greater risk than exposure to reclaimed water in a park or other landscape irrigation setting. Risks to fire fighters will be further mitigated due to their use of personal protective equipment and the requirement that they be educated in proper use of reclaimed water. Due to an increased risk of cross connection and potentially greater risk to public health, the Commission is not at this time specifically permitting the use of reclaimed water for hydrants in residential neighborhoods or for fire sprinkler systems at any residential structure. However, the Commission understands that the ability to use reclaimed water for such residential firefighting uses may have ramifications for both the costs associated with the construction of, and the need for, "potable"

water facilities. The Commission believes, however, that such concerns can be addressed through the use of the variance provisions at section 84.12, whereby the Division can allow such uses on a case-by-case basis, subject to the proponent providing a quality of reclaimed water better than Category 2, and implementing additional BMPs that ensure the impact to public health and the environment are appropriately limited.

Where reclaimed water is used at interior sprinklers, with numerous fire protection outlets, there are increased risks of public exposure to reclaimed water during non-emergencies and for cross connections between the reclaimed water and potable water systems. The Commission is requiring that the additional conditions listed in section 84.8(A)(7) be implemented to strictly minimize these risks.

Water used for firefighting typically becomes polluted during its use. The Commission finds that there is little increased environmental risk associated with the reclaimed water source versus a potable water source for the firefighting water. Due to the emergency nature and low frequency of occurrence, discharges from firefighting activities are exempt from NPDES permitting requirements for non-storm water discharges (40CFR Part 122, §122.26) and shall likewise be exempt from the no discharge to waters of the State provision in section 84.4 of this Regulation.

The Commission reorganized and edited section 84.9 [formerly 84.7] to address conditions for each different type of use of reclaimed domestic wastewater. Users must address each condition in a "User Plan to Comply" which varies for each type of use. (Under section 84.6, a treater must submit a User Plan to Comply for each of its users, certify that it will implement its Reuse Management Plan, and monitor the user's compliance with the User Plan to Comply and the requirements of Regulation 84.) Industrial and commercial users must submit a User Plan to Comply that describes the industrial or commercial operation or process using reclaimed domestic wastewater, an analysis of the specific use's potential risks to public health and the environment, and best management practices the user will employ to minimize such potential risks. The User Plan to Comply also includes a certification by the user that its use of reclaimed domestic wastewater is consistent with Regulation 84's purpose of protecting public health and the environment.

Modifications to this section include the following:

- 84.9(A) sets forth the conditions for the application of reclaimed domestic wastewater for landscape irrigation.
- 84.9(B) is a new section setting forth the conditions for industrial and commercial users.
- 84.9(C) sets forth conditions for use applicable to all users, regardless of type. Each of these conditions previously applied only to landscape irrigation users. [formerly 84.7(A)(1), 84.7(A)(2), 84.7(A)(3), 84.7(A)(4), 84.7(C), 84.7(E), 84.7(F), 84.7(G), 84.7(H), 84.7(I), 84.7(J), 84.7(L) and 84.7(M).]
- Former Section 84.7(D) required users to comply with the piping design guidelines contained in AWWA Manual M-24, Dual Water Systems, (AWWA, Denver, CO 1994). This reference was eliminated because the referenced guidelines are not applicable to users' irrigation, industrial and commercial piping systems. Section 84.6(A)(2) of the amended regulation requires the treater to submit proof it has obtained site application approval and design approvals pursuant to the requirements of Regulation No. 22. Treater's location and design plans and specifications are reviewed by the Division pursuant to Regulation No. 22. It is the intent of the Water Quality Control Division to use AWWA Manual M-24 as guidance during this review.

Section 84.10 [formerly 84.8], which establishes additional conditions for the use of Category 1 reclaimed domestic wastewater, was revised for clarity, completeness, and consistency with other revisions.

84.23 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY, AND PURPOSE (AUGUST, 2005 HEARING, ADOPTED OCTOBER 11, 2005 AND EFFECTIVE NOVEMBER 30, 2005)

The Commission revised section 84.11 [formerly 84.9] to account for industrial and commercial uses, and to eliminate previous monitoring requirements that were impractical and burdensome for treaters and users. Users of Category 1 reclaimed domestic wastewater for landscape irrigation must confirm that application occurred during authorized times instead of requiring the keeping of records showing the actual dates and times that restricted use water was used. This requirement saves time for the treaters, users and the Division while maintaining the original intent.

Section 84.12 [formerly 84.10] was revised for clarity, completeness, and consistency with other revisions. Section 84.13 [formerly 84.11] regarding enforcement was revised for clarity, completeness, and consistency with other revisions.

PARTIES TO THE RULEMAKING HEARING

1. Rangeview Metropolitan District
2. Colorado Wastewater Utility Council
3. The City and County of Denver, Board of Water Commissioners
4. The City of Westminster
5. Airpark Metropolitan District
6. Parker Water and Sanitation District
7. RG Consulting Engineers
8. Xcel Energy
9. Colorado Rock Products Association

84.23 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY, AND PURPOSE (AUGUST, 2005 HEARING, ADOPTED OCTOBER 11, 2005 AND EFFECTIVE NOVEMBER 30, 2005)

The provisions of sections 25-8-205(1) and 25-8-308(1)(h) C.R.S. provide the specific statutory authority for adoption of amendments to this regulation. The Commission also adopted, in compliance with section 24-4-203(4), C.R.S., the following statement of basis and purpose.

Basis and Purpose

On February 14, 2005, the Water Quality Control Division and the Joint Water Reuse Committee of the Rocky Mountain Section American Water Works Association and Rocky Mountain Water Environment Association ("Joint Committee") requested that the Commission review Regulation No. 84 for the purpose of considering additional uses of reclaimed water and other changes to the regulation. On August 8, 2005, the Commission held a rulemaking hearing during which several modifications and additions to the regulation were adopted.

As a result of this rulemaking, the Commission amended Regulation No. 84 to continue to promote the use of reclaimed water. The regulation, as amended, extends its framework to include additional uses or reclaimed water and accompanying requirements to ensure protection of public health and the environment. Specifically, the Commission is requiring reclaimed water to meet minimum standards commensurate with the risks associated with the new uses. Also, treaters and users are required to employ appropriate best management practices and to oversee the use of reclaimed water for such uses.

The Commission concludes that these amendments to Regulation No. 84 are reasonable considering the economic, environmental, and public health costs, benefits and impacts of the water reuse program.

The term “reclaimed domestic wastewater” was changed to “reclaimed water” throughout the Regulation. “Reclaimed water” is the term used in the water reuse regulations of most other states and is also used in EPA’s 2004 Guidelines for Water Reuse. It is desirable to use a common term for this highly treated water as this will assist with public education efforts.

The Commission modified section 84.4 to delete provisions that are no longer applicable and relocated the exemption for irrigation at wastewater treatment facilities to the definition of Landscape Irrigation. The Commission also added, deleted, and modified definitions to increase clarity and to achieve consistency with earlier revisions to this regulation and with other regulations. The definition of “Agricultural Use” was deleted since the regulation does not address this use at this time. The definition of “Agronomic Rate” was expanded to include watering requirements of plants in order to reinforce the Commission’s intent that passage of nutrients below the root zone be strictly minimized. This change operates in conjunction with revisions to sections 84.6(A)(3) and 84.9(A)(4). Specific uses such as Closed Loop Cooling System, Dust Control, and Fire Protection – Non Residential were deleted from section 84.8(A) and are now defined in section 84.5. The definition of “Closed Loop Cooling System” added to Section 84.5 parallels the language currently found in section 84.8(A)(5) of the rule. It is the Commission’s intent that all types of closed loop cooling systems falling within this definition are authorized to use reclaimed water. This includes re-circulating evaporative cooling systems and associated cooling water storage facilities that may be employed in the electric generation industry where public access is not allowed such as the use that has been in place at Platte River Power Authority since 1981. Definitions for “Resident-Controlled Landscape Irrigation” and “Fire Protection – Residential” were also added. For purposes of this regulation, residential areas are land use planning areas zoned for residential use, or otherwise designated for residential use by the applicable local land use planning authority.

The Commission revised section 84.6(A)(3) to require a specific analysis, prior to issuance of a Notice of Authorization, to demonstrate that reclaimed water will be applied at agronomic rates. This was done to ensure that land application done under Regulation No. 84 is protective of ground water quality in light of the Commission’s adoption of revisions to Regulation No. 61 that provide an exemption from the requirement to obtain a discharge permit, in such situations. Similarly, the Commission revised the best management practice at section 84.9(A)(4) to add additional protections for ground water.

In situations where there are applicable limitations on concentration or loading of phosphorus or nitrogen under a control regulation or TMDL, the Commission modified sections 84.6(A)(9) and 84.6(E)(6) to provide an option, at the request of the treater, to have such limitations addressed in the Notice of Authorization. Otherwise, such limitations must be included in a discharge permit issued pursuant to Regulation No. 61.

The Commission refined section 84.6(E)(7) regarding the requirement for a treater to request an amendment to the Notice of Authorization.

The Commission adopted standards and other requirements for Category 3 reclaimed water to apply to two newly authorized uses of reclaimed water. Specific Category 3 uses authorized include the use of reclaimed water for fire protection in residential areas and for landscape irrigation where a single-family resident has control of the plumbing and/or the time of irrigation. When compared with those uses where Category 1 or Category 2 reclaimed water is allowed, uses requiring Category 3 water may present an increased risk of consumption of reclaimed water due to the fact that the number of entities (e.g., single family residents) who control connections after initial construction will significantly increase and these individuals will also control the time and manner in which irrigation takes place. This increases both the possibility of a cross-connection between the reclaimed water and potable water systems and the risk of public contact with reclaimed water. Given this increased risk, the Commission adopted a standard for Category 3 reclaimed water that requires that E. coli not be detected in 75% of samples collected in any 30-day period, with a single-sample maximum for E. coli of 126 colony forming units (cfu) per 100 milliliters (ml) or a most probable number (MPN) of 126 per 100 ml, depending upon the analytical

enumeration method used. This standard recognizes that it is not practical to meet a no detect standard for an indicator organism at all times and is consistent with regulatory requirements used in other states (e.g. Florida) and with the recommendations of the EPA. The rationale for selecting 126 cfu (or MPN) per 100 ml as the single sample maximum standard is consistent with the rationale supporting the E. coli standard for Category 1 and 2 reclaimed water. The Commission found that the E. coli standard is protective of the public health and environment where Category 3 reclaimed water is used in a manner compliant with the other requirements contained in the regulation.

The Commission exercised its discretion, pursuant to *Citizens for Free Enterprise v. Department of Revenue*, 649 P.2d 1054 (Col. 1982) to adopt these requirements based upon policy considerations about the possible increased risks to public health associated with the Category 3 uses as opposed to specific scientific evidence to that effect.

In addition to compliance with the E. coli standard, treaters and users of Category 3 reclaimed water are required to develop and implement appropriate additional best management practices, including public education, to strictly reduce the risk of cross-connections between the reclaimed water and potable water systems. Additional conditions required for Category 3 uses are listed in sections 84.8(A) and 84.9(A).

As revised, section 84.8(A) requires that at a minimum, the numbered conditions indicated in the last column of Table A are required for the corresponding uses. In addition, in accordance with the authority provided in section 84.6(E), the Division may require additional conditions listed in section 84.8(A) for individual reuse activities as it determines appropriate.

The Commission decided not to include specific requirements for continuous disinfection of Category 3 reclaimed water but notes that the requirements for monitoring to determine the quality of all categories of reclaimed water should include frequent determinations to assure that disinfection is being provided prior to use.

The Commission deleted section 84.10 and added provisions to section 84.9(A)(5) regarding the mechanisms that users of Category 1 reclaimed water must employ to restrict access to areas when irrigation is taking place.

In order to avoid the need to commit an excessive amount of Division resources for regulatory oversight when Category 3 reclaimed water is used, section 84.9(A)(6) requires the treater to assume responsibility for the numerous residential users inherent when reclaimed water is used for resident-controlled landscape irrigation and there is not an acceptable entity (e.g., homeowners' association) to assume said responsibility.

The Commission moved the provisions of section 84.11(C) to subsection (B) of new section 84.10 and also added a specific requirement to report violations pursuant to new section 84.10(C)(1).

At the time the Commission initially adopted the Variance provision in Section 84.12, it excluded authorization to the Division to provide a variance for the E. coli standards. The Commission now concludes that it is appropriate to provide a variance from the "235/100 ml single sample maximum" standard on a case-by-case basis. For example, testimony was received from the City of Fort Collins and the Platte River Power Authority concerning a use that has been in effect since 1981 without incident. Some of the effluent from the city's Drake facility is pumped 27 miles in an underground pipeline for ultimate addition to Platte River's 16,000 acre foot, 500 surface acre long term carryover storage reservoir for recirculating cooling water use at the Rawhide energy station. There is no public access to any part of the process and as a result, there is no public exposure to reclaimed water and potential worker exposure is adequately limited and controlled with safety procedures and best management practices. To avoid the necessity for capital and operational costs for investments associated with meeting the single sample maximum standard in the regulation, Fort Collins and Platte River requested a limited change in the Division's authority to grant a variance from this aspect of the E.coli standard. When Regulation 84 was adopted in 2000, the Commission noted in its Statement of Basis that reclaimed domestic wastewater systems had been constructed and been in operation prior to the adoption of the regulation. It was

emphasized that this regulation is not intended to force existing systems to make capital improvements solely for assuring standardization if they accomplish the objectives of this regulation. The Commission has determined it is appropriate to provide authority to the Division to grant a variance from the single sample maximum standard when it concludes that the cost of compliance does not bear a reasonable relationship to the environmental or public health benefits.

As noted in the Statement of Basis when the Commission added E.coli to the Basic Standards for Surface Waters in 2000, there is great variability in individual bacteriological samples because bacteria are not uniformly distributed in water samples. A single sample may give a false impression of potential risk of violation of a standard based on a geometric mean. In cases where there is limited or no public exposure and potential worker exposure is controlled by best management work place standards, the resulting lower risk warrants the option for the Division to consider a variance from the single sample maximum standard.

The Commission also corrected references to "E coli" in Regulation No. 84 to the italicized E coli.

PARTIES TO THE RULEMAKING HEARING

1. RMWEA/RMSAWWA Water Reuse Joint Committee
2. Platte River Power Authority
3. Plum Creek Wastewater Authority
4. Dominion Water & Sanitation District
5. Eastern Adams County Metropolitan District
6. The City of Aurora
7. Xcel Energy

84.24 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY, AND PURPOSE (August, 2007 Hearing)

The provisions of sections 25-8-205(1) and 25-8-308(1)(h) C.R.S. provide the specific statutory authority for adoption of amendments to this regulation. The Commission also adopted, in compliance with section 24-4-203(4), C.R.S., the following statement of basis and purpose.

Basis and Purpose:

Regulation 84.4 was amended to state that wastewater that has been treated and is used at a domestic wastewater treatment plant (DWWTP) site for landscape or process uses is not subject to Regulation 84. Landscape irrigation with treated effluent at a DWWTP was previously excluded in the definition of landscape irrigation. Section 84.5(10). This exclusion was deleted from the definitions section and moved to the applicability section 84.4, together with a new exclusion dealing with process waters used at a DWWTP site. The Commission believes it is more logical to include these exclusions in the section dealing with applicability.

The Commission found that it is appropriate to exclude process water used at a DWWTP site because process water uses are restricted to the DWWTP site and access to these sites is restricted and not open to the public. The use of process water is limited and controlled by DWWTP staff who are trained in the handling and use of process water. It is the Commission's intention that after the process use is completed, the process water will be captured and returned to the wastewater treatment process and not discharged separately to waters of the state.

The Commission deleted the provision in section 84.6(A)(3) that allowed landscape irrigation to be done above agronomic rates where the treater or user, as appropriate, had obtained a CDPS ground water discharge permit. The Commission understands that there are no entities currently making use of this provision and found it to be inconsistent with the original intent of Regulation 84 which was to address the use of reclaimed water under a single regulation. In addition the Commission finds, based on the typical nutrient content of treated wastewater and the watering needs of landscape plants, that application of reclaimed water at agronomic rates is achievable under normal circumstances.

**84.25 STATEMENT OF BASIS SPECIFIC STATUTORY AUTHORITY AND PURPOSE: MAY 13, 2013
RULEMAKING; EFFECTIVE JULY 30, 2013**

The provisions of sections 25-8-202, 25-8-205(1) and 25-8-308(1)(h), C.R.S. provide the specific statutory authority for adoption of amendments to this regulation. The Commission also adopted, in compliance with section 24-4-203(4), C.R.S., the following statement of basis and purpose.

BASIS AND PURPOSE

The use of reclaimed water has significantly increased in Colorado over the past decade and Treaters and potential Users of reclaimed water have identified an interest in new uses for reclaimed water that are not currently authorized under Regulation No. 84. Proponents from the Joint Water Reuse Committee of the Rocky Mountain Section American Water Works Association and Rocky Mountain Water Environment Association ("RMSAWWA/RMWEA") and the Colorado Section of the WaterReuse Association, participating in a Water Quality Forum Work Group, requested that the Commission review Regulation No. 84 for the purpose of considering additional uses of reclaimed water.

As the Commission indicated in its initial adoption of Regulation No. 84, the use of reclaimed water is subject to Colorado water rights law. Several large municipalities have the right to use a portion of their water supply "to extinction" under Colorado law and have significant amounts of such water that are currently being discharged from the wastewater treatment facility rather than being further treated and reused.

In the 2010 triennial review for Regulation No. 84, the Commission discussed ideas that the Division and interested parties had brought forth for adopting new uses including modifying the regulation to establish broader categories of uses within which the Division could approve new uses. The Commission understands that the Division would need additional resources to implement such a scheme. However, in the interest of addressing the growing use of reclaimed water in Colorado in a timely manner, the Commission approved the renaming and addition of several specific new uses through these modifications to Regulation No. 84.

The Commission found that the following modifications to the authorized uses in Section 84.8 Table A are consistent with the intent of the original authorization of these uses, and present no increase in the potential risk to human health or the environment. By modifying the nomenclature and definitions for these categories of approved uses, the regulation and Notices of Authorization issued by the Division afford the same protections for comparable industrial and commercial uses with similar human exposure, environmental release, and cross-connection potential.

- "Cooling Tower" was renamed "Evaporative Industrial Processes"
- "Closed Loop Cooling System" was renamed "Non-Evaporative Industrial Processes"
- "Dust Control", "Soil Compaction", and "Mechanized Street Cleaning" were combined and renamed "Non-Discharging Construction and Road Maintenance"
- "Concrete Mixing and Washout" was divided into two uses, "Non-Evaporative Industrial Processes" and "Washwater Applications," respectively

The Commission found that adding several new uses, with appropriate conditions placed on their use, will further facilitate the safe and efficient use of Colorado's limited water resources. The Commission approved the addition of the following Commercial Uses: Commercial Laundries, Automated Vehicle Washing, and Manual Non-Public Vehicle Washing, and a new Agricultural Irrigation use.

Evaporative Industrial Processes

The Evaporative Industrial Processes use includes, but is not limited to, the following representative applications where water is used in an industrial process where the benefit of such use requires the evaporation of water, requiring additional make-up water: cooling tower use and gas and odor adsorption. In modifying the nomenclature for this category so that it now covers multiple evaporative industrial process uses, the Commission recognized that many evaporative industrial processes have the potential to use reclaimed water instead of potable or other water supplies, with similar low potential for human exposure, releases to the environment, and cross connections. It is the Commission's intent that no discharges to waters of the state shall be allowed with this use unless authorized via an approved permit under the Colorado Discharge Permit System (CDPS).

Non-Evaporative Industrial Processes

The Non-Evaporative Industrial Processes use includes, but is not limited to, the following representative applications where water is used in an industrial process, is not evaporated in the process, is used within a contained system, and is either discharged to a sewer system as a blow down (e.g., closed loop cooling systems) or is incorporated into a product that is not intended for personal contact or ingestion (e.g., those in which the water is retained in the product and conditions prevent excessive microorganism growth, such as the high pH of batched concrete): closed loop cooling systems (a previously-approved use, Sections 84.8 and 84.22), concrete makeup water (a previously-approved use as concrete mixing and washout, Sections 84.8 and 84.22), boiler feed water, water for lime slaking, and industrial process makeup water. In modifying the nomenclature for this category so that it now covers multiple non-evaporative industrial process uses, the Commission recognized that many industrial processes have the potential to use reclaimed water instead of potable or other water supplies, with similar low potential for human exposure, releases to the environment, and cross connections. It is the Commission's intent that no discharges to waters of the state shall be allowed with this use unless authorized via an approved permit under the CDPS.

Non-Discharging Construction and Road Maintenance

This approved use incorporates the following previously-approved representative uses for Mechanized Street Sweeping, Soil Compaction, and Dust Control. Other similar uses of water, including but not limited to cooling water for pavement cutting operations, are also authorized under this approved use. It is the Commission's intent that no discharges to waters of the state shall be allowed with this use unless authorized via an approved permit under the CDPS.

Washwater Applications

The Commission approved the new Washwater Applications use, which includes concrete washout as previously approved under Concrete Mixing and Washout. Washwater Applications would also include water used in washing of miscellaneous equipment, washing of product in mineral processing, and other similar uses where reclaimed water is used to remove material from equipment or a product. This use has been evaluated for risks to human health via ingestion, inhalation, and dermal contact. Best management practices (BMPs, specified as Additional Conditions in Section 84.8 and 84.9) and allowable water qualities are specified to mitigate these risks. It is the Commission's intent that no discharges to waters of the state shall be allowed with this use unless authorized via an approved permit under the CDPS.

Commercial Laundries, Automated Vehicle Washing, and Manual Non-Public Vehicle Washing

The Commission approved three new uses not previously authorized under Regulation 84 (Commercial Laundries, Automated Vehicle Washing, and Manual Non-Public Vehicle Washing) based upon an evaluation of the potential human health risks via ingestion, inhalation, dermal contact and cross-connection as well as the potential for discharging reclaimed water to a water of the state (groundwater or surface water). BMPs for each use and allowable water qualities were specified to minimize these risks. In assessing the proposed modifications to Regulation 84, typical uses of water in commercial laundries and automated and manual vehicle washing facilities were reviewed to characterize the likelihood and impacts of human contact with reclaimed water and releases of reclaimed water to waters of the state.

The Commission found that the potential for ingestion is negligible for all three proposed uses, in light of the limited access to the public and the commercial and industrial nature of the water use. The risk of ingestion in these new uses is further mitigated by the BMPs specified for these uses in Regulation 84. In light of the potential worker or public contact with aerosols in vehicle washing applications, the Commission considered additional information to assess the potential for human health effects of such contact. This information included the 2012 USEPA Guidelines for Water Reuse, regulations in other states that authorize commercial laundry and vehicle washing uses, a risk assessment based on available research and literature regarding health impacts of inhalation of recycled water aerosols, and a comparison of water quality in internally-recycled vehicle washing water systems fed by potable water to the water quality of recycled water produced by an existing Treater. This indicated to the Commission that a high level of disinfection (Category 3 water) is appropriate for situations where there is a high likelihood of frequent worker contact with reclaimed water aerosols for these uses. Alternatively, BMPs should be employed to prevent worker inhalation exposure if less stringent disinfection (Category 2 water) is employed.

The Commission found that:

- Secondary treatment and disinfection (Category 2 Reclaimed Water) is an appropriate treatment requirement for the use of reclaimed water in commercial laundry where there is no frequent worker or public exposure to aerosols generated from reclaimed water use.
- In vehicle washing facilities with a likelihood of worker or public exposure to aerosols generated from reclaimed water use, filtration and high-level disinfection (Category 3 Reclaimed Water) provides human health protection against aerosol inhalation risks. Alternatively, BMPs must be used to prevent the inhalation of aerosols with use of Reclaimed Water Category 2.
- Effective BMPs for physically preventing human contact with aerosols include personal protective equipment documented to prevent inhalation of aerosols, or other means as documented by a certified industrial hygienist.

Accordingly, the Commission approved the addition of two new Additional Conditions at Section 84.8(A)(7) and 84.8(A)(8) for applicability to Commercial Laundries, Automated Vehicle Washing, and Manual Non-Public Vehicle Washing as identified in 84.8 Table A. The Commission also determined that the Additional Condition in 84.8(A)(7) is applicable to the following renamed and new uses, in consideration of the type of use and potential for frequent worker or public exposure to aerosols: Washwater Applications, Non-Discharging Construction and Road Maintenance, and Non-Evaporative Industrial Processes.

The Commission found the overall risk to Commercial Laundry and Vehicle Washing workers and the public associated with ingestion and dermal contact is less than swimming at a swim beach and comparable to or less than other previously approved commercial and industrial uses of Category 1, 2, and 3 Reclaimed Water. For each of these proposed uses, the Commission found the potential for cross-connecting potable and recycled water piping is similar to previously approved Commercial and Industrial uses of Category 1, 2, and 3 Reclaimed Water. The existing BMPs for cross-connection control in Regulation 84 (at 84.9(C)(5), 84.9(C)(7), and 84.9(C)(8)) will apply to these new uses as well.

The Commission approved the modification of Section 84.8(A)(3) to read "Application rates or other measures shall be employed to minimize ponding on or runoff from the area approved for application or use," and specified that this Additional Condition be required for Automated Vehicle Washing and Manual Non-Public Vehicle Washing uses. It is the Commission's intent that no discharges to waters of the state shall be allowed with these uses unless authorized via an approved permit under the CDPS.

Non-Food Crop Irrigation and Silviculture

The Commission found that the use of reclaimed water for irrigation of certain agricultural crops and trees, when implemented in accordance with the reclaimed water quality standards and BMPs established in Regulation 84, is protective of public health and the environment. Adding agricultural irrigation as an approved use of reclaimed water will encourage the expanded use of reclaimed water in Colorado and is anticipated to reduce the regulatory compliance burden on Treaters and Users by allowing them to be permitted under a single control regulation where multiple approved uses of reclaimed water are implemented.

Health risks to the public or workers associated with potential contact with reclaimed water used for agricultural irrigation were determined to be of a comparable or lower magnitude than those associated with landscape irrigation. Environmental risks associated with runoff or excessive percolation of reclaimed water to waters of the state are determined to be of a comparable or lower magnitude than those risks associated with landscape irrigation. The Commission found that there is little increased risk of cross connection associated with the use of reclaimed water versus traditional sources of water used for agricultural irrigation.

The Commission found that Category 1 water is acceptable for irrigation of those non-food crops permitted to be irrigated with reclaimed water pursuant to this Control Regulation and that the criteria for Category 1 water are generally consistent with the treatment level requirements and water quality standards adopted by several other states (e.g., Arizona, California, Florida, and Texas) and countries for the irrigation of non-food crops. The Commission found that the BMPs established for restricted access landscape irrigation are appropriate and adequate for agricultural irrigation.

Annual Report Requirements

As part of this rulemaking, the Commission also revised the annual reporting provision to revise the due date of annual reports from January 31 of each year to March 31, to allow Treaters sufficient opportunity to compile reclaimed water use data and related records from the preceding calendar year.

PARTIES TO THE RULEMAKING

1. Colorado Section of the WaterReuse Association, the Joint Water Reuse Committee of Rocky Mountain Water Environment Association, and Rocky Mountain Section of the American Water Works Association (the Proponents)
2. City and County of Denver
3. City of Aurora
4. City of Colorado Springs and Colorado Springs Utilities
5. Rangeview Metropolitan District

84.26 STATEMENT OF BASIS SPECIFIC STATUTORY AUTHORITY AND PURPOSE: AUGUST 6, 2018 RULEMAKING; EFFECTIVE NOVEMBER 6, 2018

The provisions of sections 25-8-202, 25-8-205(1), and 25-8-205.8, C.R.S., provide the specific statutory authority for adoption of amendments to this regulation. The Commission also adopted, in compliance with section 24-4-203(4), C.R.S., the following statement of basis and purpose.

BASIS AND PURPOSE

On April 30, 2018, House Bill 18-1069 was enacted, essentially codifying Regulation 84 provisions such as category standards 1 through 3 and the pre-existing allowed uses of reclaimed water for categories 1 through 3. The primary purpose of House Bill (HB) 18-1069 was to add toilet and urinal flushing in multifamily residential and nonresidential structures as category 3 uses for reclaimed domestic wastewater. The Bill becomes effective on August 8, 2018.

Prior to the enactment of HB 18-1069, the Commission noticed a regulatory proposal by Denver Water to modify Regulation #84 to add toilet and urinal flushing ("fixture"), indoor cannabis irrigation, and adopt new standards for reclaimed water treatment for certain types of treatment systems. Denver Water subsequently withdrew its proposal to add indoor cannabis irrigation to Regulation #84 from consideration. Denver Water and the Division also submitted a motion for consideration of a joint proposal to modify Regulation #84.

On August 6, 2018, the Commission held a rulemaking hearing to consider the joint proposal presented by Denver Water and the Division, for modification of Regulation#84. Following the rulemaking hearing, the Commission updated Regulation #84 to add fixture flushing consistent with the specific definitions and requirements contained in HB 18-1069. The Commission also adopted new definitions and treatment requirements for two types of reclaimed water treatment systems: "centralized reclaimed water treatment systems" (centralized systems) and "localized reclaimed water treatment systems" (localized systems) to further encourage the reuse of reclaimed domestic wastewater and ensure protection of public health. In addition, the Commission adopted a statutory definition of "point of compliance"; described treatment, filtration, and disinfection requirements for centralized systems producing category 3 reclaimed water for toilet flushing; adopted a log reduction treatment approach for localized treatment systems with monitoring requirements for localized systems to ensure that these systems are operating correctly; and additional cross-connection control requirements for uses of reclaimed water used for indoor non-potable uses.

A. Definition of Point of Compliance

The Commission modified the definition of point of compliance to conform with the new statutory definition of point of compliance adopted in HB 18-1069. The definition provides that the point of compliance "means, except as provided in subsection (1)(f)(II) of this section, a point, as identified by the person that treats the water in the reclaimed domestic wastewater treatment process or the reclaimed domestic wastewater transportation process, that occurs after all treatment has been completed but before dilution and blending of the water has occurred." Subsection (1)(f)(II) provides that "If reclaimed domestic wastewater is used for indoor nonpotable uses within a building where plumbing fixtures are accessible by the general public, 'point of compliance' is at the location where water is delivered to the occupied premises."

Subsection (1)(f)(I) and (II) in HB 18-1069 refer to the categories of reclaimed water (categories 1 through 3) and the standards that must be met regarding total suspended solids, turbidity and *E. coli*. The Commission construed subsection (1)(f)(II) as applying to the disinfection residual. Disinfection residual is a best management practice used to prevent regrowth of waterborne pathogens within indoor plumbing systems. It is not practical from an operational, economic or implementation standpoint to continuously test for *E. coli* at buildings using reclaimed water indoors, but meeting the disinfection residual requirements at the building is practical and will protect public health. The treatment facility supplying the reclaimed water will meet the statutory and regulatory standards after treatment and before dilution and blending.

To protect against potential regrowth of opportunistic pathogens and increases in turbidity in the underground distribution system prior to entering a building, Regulation 84.9(A)(9)(a-c) requires that users follow a best management practice of monitoring for disinfectant residual and/or another approved disinfection methods for indoor uses of reclaimed water, which monitoring may occur at the distal end of the plumbing system. These treatment approaches are intended to prevent growth of opportunistic pathogens, such as *legionella* from proliferating within building plumbing pipes and fixtures. Meeting the residual requirements at the distal end of the plumbing system will protect public health from opportunistic pathogens within buildings as an additional protective measure.

With regard to the point of compliance for localized systems, the point of compliance will be a point, as identified by the treater, in the reclaimed domestic wastewater treatment process or the reclaimed domestic wastewater transportation process, that occurs after all treatment has been completed but before dilution and blending of the water has occurred. The Commission finds that in most cases localized systems will be located at or near the tap of the building, parcel, or district where domestic wastewater is being treated and used. This means that it is less likely that the disinfection residual in reclaimed water produced from localized systems will dissipate due to the shorter travel time for reclaimed water from localized systems to the point of use. In addition, for localized systems there is continuous monitoring of the process system to confirm log removal targets are being met. For these reasons, the point of compliance for disinfection residual for localized systems located near the site of use may also be at the point identified by the treater that occurs after all treatment has been completed but before dilution and blending of the water has occurred.

B. Definitions of Centralized Systems and Localized Systems

The Commission adopted definitions for centralized and localized reclaimed water treatment systems; defined treatment, filtration, and disinfection requirements for centralized systems producing Category 3 reclaimed water for fixture flushing; and adopted a new log reduction treatment approach and control monitoring framework for localized systems to track whether the treatment control system is operating to meet *E. coli* and turbidity requirements.

Centralized Systems

Regulation 84 previously did not define “reclaimed water treatment systems” or “centralized reclaimed water treatment systems”. Rather, reclaimed water treatment systems were encompassed by the definition of “treater” and the definition of “reclaimed water”. The adoption of the definition of “centralized reclaimed water treatment systems” is intended to encompass the reclaimed water treatment systems that would have been defined as a “treater” or “reclaimed water” in the original, 2000 version of Regulation #84.

To distinguish centralized systems from localized systems, the Commission adopted a definition of “centralized reclaimed water treatment systems” that define such systems as receiving domestic wastewater from a diverse service area for treatment to produce reclaimed water for beneficial use where the service area has meaningful inputs from industrial or other diluting sources. The phrase “meaningful inputs or other diluting sources” relates to the consistent watering down of waterborne pathogens in the untreated source water consistent with large municipal-like collection systems.

The Commission adopted filtration standards for reclaimed water produced from centralized systems for toilet flushing based upon a multi-barrier approach. California Title 22 establishes a framework for multiple barrier framework supported by a microbial risk assessment (“MRA”). The Commission found the California treatment recommendations to be too limiting for the expansion of reuse in Colorado and has allowed a wider range of filtration techniques that provide equivalent microbial protections appropriate for indoor reuse application. The Commission concluded that there should be a defined list of technologies allowed for Category 3 reclaimed water used for toilet flushing because of the higher risk of public exposure to reclaimed water from unintended cross-connections. All types of filtration are not adequate for pathogen reduction for indoor uses of reclaimed water. However, the Commission has listed accepted

filtration technologies which include any filter approved per 5CCR 1002-11 and the ability to challenge test and demonstrate reclaimed water specific filtration techniques.

The Commission agreed with the California Title 22 minimum requirement of 5 log virus treatment for indoor uses of reclaimed water. The Commission found that the virus inactivation tables published by the EPA are appropriate when chemical disinfection is used. If UV disinfection is employed, virus disinfection should be measured against Hepatitis A for chemical disinfection or 40 mJ/cm² for ultraviolet light disinfection.

The Commission adopted a new section 84.8, which describes the filtration and disinfection requirements for centralized reclaimed water being used for fixture flushing. The Commission also adopted definitions of filter technologies, including bag filter and cartridge filter, conventional filtration, direct filtration, and membrane filtration. To add clarity regarding the meaning of treatment standards, the Commission adopted definitions for secondary treatment and treatment technique requirements.

The Commission directed the Division to hold a stakeholder process with reclaimed water users, treaters and other interested parties to consider whether similar or alternative treatment techniques should be applied to other categories of reclaimed water and authorized uses.

Definition of Localized Systems

Localized reclaimed water treatment systems are defined by several characteristics that distinguish them from centralized systems. Specifically, localized systems:

- receive and treat domestic wastewater that does not have meaningful inputs from industrial and other diluting sources.
- are located relatively close to the location where wastewater is generated meaning that there is little travel time for wastewater, and less time for pathogen die off to occur.

These factors contribute to more concentrated raw wastewater, and therefore higher pathogen loads in the domestic wastewater treated by localized systems.

To address the distinct characteristics of localized systems, the Commission defined “localized reclaimed water treatment systems” as systems that receive and treat domestic wastewater from a single building, multiple buildings within a single property or area bounded by dedicated streets or ways, or a district designated by a City or County for treatment to produce reclaimed water for beneficial use where the source water does not have meaningful inputs from industrial or other diluting sources. This definition is intended to reflect that localized systems collect wastewater from a more concentrated and defined area as compared to centralized systems.

The Commission adopted a new rule providing that NOAs for use of reclaimed water from localized systems may include requirements for limitations on contributions from non-domestic sources as necessary to prevent pass through, interference or impacts on public health or the environment from those sources. The Commission also adopted a requirement that the user plan to comply for localized systems identify the percentage contributions from each wastewater input to the localized system and the location of the input as well as any limitations on contributions from non-domestic sources.

Treatment Based Framework for Localized Systems

The Commission also adopted a treatment-based framework for localized systems. The framework for localized systems is structured around treatment performance criteria. A treatment-based approach for localized systems helps ensure that systems are designed properly, that public health will be protected despite less frequent sampling and higher degrees of automation, and helps streamline permitting for a variety of small treatment systems throughout the state.

The treatment-based approach utilizes treatment performance-based logarithmic (“log”) reduction targets for the treatment of pathogens in localized systems to meet various risk thresholds. The Commission directs the division to develop a policy (localized system design criteria) that will define treatment credits for various unit processes or alternate demonstration/testing option while discharging to the sewer. Treatment-based approach allows for an automated approach through continuous monitoring, and avoids the need to perform frequent grab samples for *E. coli*, a cost burden that provides little benefit for assessing how localized systems perform in real time.

The Commission considered two different risk levels for localized system log removal targets, and concluded that due to the high risk of unintended cross-connections between potable and reclaimed water plumbing, 10^{-4} risk level (1 infection per 10,000 individuals annually) is appropriate for localized systems treating reclaimed water for Category 3 uses. The Commission concluded that 10^{-2} risk level (1 infection per 100 individuals annually) is appropriate for localized systems treating reclaimed water only for Category 2 uses due to the low risk of exposure from unintended cross connections. The Commission also approved 10^{-2} risk level for enteric viruses only for localized systems treating reclaimed water only for Category 1 uses, again due to the low risk of exposure from unintended cross connections and restricted access limits for on-site uses.

Because localized systems generally lack access to on-site laboratories and more limited staffing, the Commission adopted requirements for continuous treatment monitoring of unit processes with high frequency (on the order of minutes between sample analysis and recording) to ensure those processes are operating to specification. The Commission found that localized systems should be continuously monitored to ensure that treatment is performing as expected.

The Commission decided that localized reclaimed water system treaters should not be required to continuously monitor for *E. coli* because localized systems that treat to the log removal targets adopted by the Commission will meet the *E. coli* limits in section 84.7, so long as the localized system process controls are operated and maintained in accordance with their design as verified by the monitoring of the unit processes. The Commission found that the continuous treatment monitoring process, as well as the initial field verification, will verify that the log removal targets are being met, and that the localized system is meeting the required log removal targets and therefore in compliance with the *E.coli* standard for Categories 1, 2 and 3 reclaimed water. For these reasons, the Commission determined it is not necessary for localized systems to consistently monitor for *E.coli*. Acceptable surrogate parameters for localized systems listed in Table C of Section 84.10, if operating properly and continuously monitored and verified, will result in the log reduction targets in Table B in 84.10 and meet or exceed the standards provided in Categories 1, 2 and 3 of reclaimed water. The Commission approved several surrogates in Table C for monitoring the operation of system process control, and directed the Division to develop a policy approving other acceptable surrogates for continuous monitoring of localized systems.

The type of continuous monitoring should be selected on a system-by-system basis. During the field verification and commissioning study, the treater must confirm that the treatment technologies have been installed in accordance with the approved design and are operating per their specifications. The monitoring approach will be included in the operations and monitoring plan.

The Commission currently intends for localized systems, like centralized systems, to be approved under the site location and design approval process in Regulation 5 CCR 1002-22, and encourages the Division to hold a stakeholder process to consider modifications to Regulation 22 to consider any changes that should be made to address localized systems.

The Commission also adopted a requirement providing that a user include as part of its user plan to comply an affidavit attesting that the user employs a certified operator or an agreement showing that a certified operator has been retained. The Commission determined that this is necessary to ensure that the user is capable of operating the localized system and able to comply with Regulation #84. The report must be certified by the user.

To protect water provider water rights, the Commission adopted language requiring that letters of intent include an affirmation that the proposed installation of a localized system is allowed by the water service provider where the localized system is located in the service area of a water provider.

C. Basis of Requirements for Fixture Flushing

Risk of Exposure to Reclaimed Water from Fixture Flushing

The Commission approved reclaimed water for fixture flushing in multi-family and non-residential structures. The primary risk of exposure to reclaimed water when used for toilet flushing is from unintended cross-connections with potable water plumbing. To minimize risk of exposure to reclaimed water from unintended cross-connections with potable water plumbing, the Commission adopted additional disinfection requirements and cross-connection control requirements.

Disinfection Requirement for Toilet and Urinal Flushing Using Centralized and Localized System Reclaimed Water

A BMP of a minimum of 0.2 mg/L for free or 0.5 mg/L for monochloramines of chemical disinfectant is required within the reclaimed water of premise plumbing of buildings approved for indoor toilet and urinal flushing. This BMP mitigates the potential for *Legionella* exposure associated with indoor uses. The Division may approve alternative disinfection approaches that have equivalent protection against premise plumbing pathogens. The Commission directs the Division to hold a stakeholder process to determine whether similar or different disinfection requirements should be applied to other categories of indoor uses for reclaimed water. The commission also discussed the importance of ensuring a maximum amount of chlorine residual is not exceeded for indoor uses, especially in light of the potential for chlorine boosting to be occurring. The commission felt that the maximum levels required by the International Plumbing Code address the issue, however the commission expects that during the development of future changes to this regulation, the division and stakeholders will consider whether the addition of a maximum chlorine residual level is necessary in this regulation.

Cross Connection Control Requirements for Toilet Flushing

The Commission included a requirement providing that only licensed plumbers may perform maintenance or make modifications to plumbing within structures that use reclaimed water for toilet flushing. Structures using reclaimed water for toilet flushing must maintain signage providing notice that modifications may be performed only by licensed plumbers.

The Commission determined that structures that use reclaimed water indoors must have an approved cross connection control device or method to prevent contamination of potable water distribution systems also serving the structures. In addition, the owner of the structure using reclaimed water for toilet or urinal flushing must conduct testing to detect uncontrolled cross connections by a certified cross-connection control technician prior to initial operation of the system and at intervals thereafter as mandated in the notice of authorization. Additionally, where reclaimed water is used indoors and could be cross connected with other non-potable water supplies, devices must be installed at service connections to protect the higher quality water from accidental contamination from the lower quality water source.

The user must maintain a current diagram of the structure's potable and reclaimed water plumbing. The public should not have access to the plumbing within structures that use reclaimed water indoors. Structures using reclaimed water for fixture flushing must be in compliance with the State Plumbing Code promulgated by the Colorado State Plumbing Board.

The Commission adopted a rule clarifying that use of reclaimed water for indoor fixture flushing is prohibited if after treatment reclaimed water is stored in an outdoor open-air storage structure.

Additional Requirements for Fixture Flushing

To protect public health and ensure a continuity of water supply, the Commission determined that users of reclaimed water for toilet flushing must maintain a backup potable water supply connection in the event of upsets or a failure of a localized reclaimed water treatment system or centralized reclaimed water treatment system.

The Commission also adopted a requirement that users have a protocol to switch to potable water and redirect reclaimed water to the sanitary sewer in the event that the reclaimed water is not in compliance with Regulation #84.

D. House Bill 18-1069

The Commission finds that its modifications to Regulation #84 are consistent with the intent of HB 18-1069, and presents no increase in the potential risk to human health or the environment. The Commission also found that its modifications further facilitate the safe and efficient use of Colorado's limited water resources.

The addition of the use of reclaimed water for toilet and urinal flushing as a Category 3 Standard is authorized by HB 18-1069. This bill authorizes reclaimed domestic wastewater to be used for indoor toilet and urinal flushing if the reclaimed water meets the Category 3 Standard. HB18-1069, Section 3(2)(c)(IV); § 25-8-205.7(2)(c)(IV), C.R.S.

The Commission further found that the bifurcated designation of reclaimed water treatment systems is also within the authority granted by HB18-1069. The bill amends the previous statutory definition of "reclaimed domestic wastewater". HB18-1069, Section 1; § 25-8-103(17.5), C.R.S. However, the bill does not define the reclaimed water treatment systems that would produce reclaimed domestic wastewater. Control regulations may be promulgated to describe requirements and standards that will encourage the reuse of reclaimed domestic wastewater. See HB-1069, Section 2(1)(f); § 25-8-205(1)(f), C.R.S. Centralized systems are the default reclaimed water systems that were encompassed by the prior Regulation 84 definition of "treater". The Commission found that the addition of "localized systems" as another type of treatment system that would also produce reclaimed domestic wastewater would encourage the use of reclaimed domestic wastewater, consistent with the declaration in HB 18-1069.

The other substantive changes to the regulation describe treatment, filtration, disinfection, monitoring, and other technical requirements. The Commission determined that the addition of these requirements are consistent with the authority granted by HB18-1069. The bill requires wastewater to "at a minimum" receive secondary treatment with filtration and disinfection in order to meet a Category 3 Standard. HB18-1069, Section 3, subsection (1)(c)(I); § 25-8-205.7(1)(c)(I), C.R.S. However, the bill does not define "secondary treatment," "filtration," or "disinfection". It also does not define or describe the monitoring or technical requirements necessary to ensure reclaimed water meets the requirements for each Category Standard. Control regulations may be promulgated to describe requirements and standards that will protect public health and encourage public use. See HB-1069, Section 2(1)(f); §25-8-205(1)(f), C.R.S. The Commission finds that the requirements adopted herein concerning treatment, filtration, disinfection, monitoring, and other technical requirements strike a proper balance between the objectives of protecting public health and encouraging the reuse of domestic wastewater.

PARTIES TO THE RULEMAKING

1. Denver Water
2. City and County of Denver
3. Aurora Water Department
4. City of Boulder

5. Marijuana Industry Group
 6. LivWell Enlightened Health
 7. Cannabis Business Alliance
 8. Meridian Metropolitan District
 9. Metro Wastewater Reclamation District
 10. Sand Creek Metro District
 11. WaterReuse Colorado
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