

This draft reflects the California Department of Health Services (CDHS) Drinking Water Program's current thinking on the regulation of recharge of groundwater with recycled water.

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Title 22, CALIFORNIA CODE OF REGULATIONS

DIVISION 4. ENVIRONMENTAL HEALTH

CHAPTER 3. RECYCLING CRITERIA

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ARTICLE 1. DEFINITIONS

Section 60301.080. 24-hour Composite Sample.

“24-hour composite sample” means a combination of no fewer than eight individual samples obtained at equal time intervals during a 24-hour period, such that the volume of each individual sample is proportional to the flow at the time of sampling.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.120. Aquifer.

“Aquifer” means a geologic formation, group of formations, or portion of a formation capable of yielding groundwater to wells or springs.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.190. Diluent Water.

“Diluent water” means water other than treated wastewater that actively or passively is used to dilute treated wastewater in a groundwater recharge reuse project.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.370. Groundwater.

“Groundwater” means water below the land surface in a saturated zone.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.380. Groundwater Basin.

“Groundwater basin” means an aquifer or a stacked series of aquifers with reasonably well-defined boundaries.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.390. Groundwater Recharge Reuse Project

“Groundwater recharge reuse project (GRRP)” means a project that uses recycled water and has been planned and is operated for the purpose of recharging a groundwater basin designated in the Water Quality Control Plan [defined in Water Code section 13050(j)] for use as a source of domestic water supply, and that has been identified as a GRRP by a RWQCB.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Sections 13520, 13521, and 13050(j), Water Code.

Section 60301.610. Mound.

“Mound” means a localized temporary elevation in a water table that builds up as a result of the localized downward percolation of waters that have been discharged to a spreading area.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.670. Project Sponsor.

“Project sponsor” means any agency that receives water recycling requirements for a GRRP from a RWQCB and is, in whole or part, responsible for the GRRP meeting the requirements of this Chapter.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.680. Public Water System.

“Public Water System” has the same meaning as defined in section 116275(h) of the Health and Safety Code.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 116275(h), Health and Safety Code.

Section 60301.690. Recycled Water.

“Recycled water” has the same meaning as defined in subdivision (n) of section 13050 of the Water Code.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13050, Water Code.

Section 60301.705. Recycled Water Contribution (RWC).

“Recycled water contribution (RWC)” means the quantity of recycled water applied at the GRRP spreading area or subsurface injection facility divided by the sum of the recycled water applied at the GRRP spreading area or subsurface injection facility and diluent water meeting the requirements of section 60320.035.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.770. RWQCB.

“RWQCB” means Regional Water Quality Control Board.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.780. Saturated Zone.

“Saturated zone” means an underground region in which all interstices in and between natural geologic materials are filled with water.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.810. Spreading Area.

“Spreading area” means an area where water is applied to the land surface for purposes of recharging the groundwater.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.840. Subsurface Injection.

“Subsurface injection” means the application of water to the groundwater basin by the controlled insertion of water below the ground surface.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.850. Surface Spreading.

"Surface spreading" means the controlled application of water to the spreading area resulting in the recharge of a groundwater basin.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.860. Total Nitrogen.

"Total nitrogen" means the sum of concentrations of nitrogen in ammonia, nitrite, nitrate, and organic nitrogen-containing compounds, expressed as nitrogen.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60301.870. Total Organic Carbon (TOC).

"Total organic carbon (TOC)" means the concentration of organic carbon present in water that is able to be oxidized to carbon dioxide.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

ARTICLE 5.1. GROUNDWATER RECHARGE

~~Section 60320. Groundwater Recharge.~~

~~(a) Reclaimed water used for groundwater recharge of domestic water supply aquifers by surface spreading shall be at all times of a quality that fully protects public health. The State Department of Health Services' recommendations to the Regional Water Quality Control Boards for proposed groundwater recharge projects and for expansion of existing projects will be made on an individual case basis where the use of reclaimed water involves a potential risk to public health.~~

~~(b) The State Department of Health Services' recommendations will be based on all relevant aspects of each project, including the following factors: treatment provided; effluent quality and quantity; spreading area operations; soil characteristics; hydrogeology; residence time; and distance to withdrawal.~~

~~(c) The State Department of Health Services will hold a public hearing prior to making the final determination regarding the public health aspects of each groundwater recharge project. Final recommendations will be submitted to the Regional Water Quality Control Board in an expeditious manner.~~

~~Note: Authority cited: Section 208, Health and Safety Code; and Section 13521, Water Code. Reference: Sections 13520 and 13521, Water Code.~~

Section 60320. General Requirements.

(a) All recycled water used for a GRRP shall be from a wastewater management agency that:

(1) administers an industrial pretreatment and pollutant source control program;

(2) implements and maintains a source control program that includes at a minimum:

(A) an assessment of the fate of Department-specified contaminants through the wastewater and recycled water treatment systems,

(B) contaminant source investigations and contaminant monitoring that focus on Department-specified contaminants,

(C) an outreach program to industrial, commercial, and residential communities within the sewage collection agency's service area for the purpose of managing and minimizing the discharge of contaminants of concern at the source, and

(D) an up-to-date inventory of contaminants discharged into the wastewater collection system so that new contaminants of concern can be readily evaluated.

(3) is compliant with the effluent limits established by the Department and/or RWQCB for each Department-specified contaminant.

(b) Prior to operation for new GRRPs, or during the first year of operation after **[insert effective date]** for existing GRRPs, each GRRP shall have a Department approved plan that provides an alternative source of domestic water supply, or a Department approved treatment mechanism, to any user of a producing drinking water source that, as a result of the GRRP;

- (1) violates California drinking water standards,
- (2) has been degraded to the degree that it is no longer a safe source of drinking water, or
- (3) receives water that fails to meet the requirements in sections 60320.010(c), (d), or (e).

(c) A public hearing for each GRRP shall be held prior to the Department submitting its recommendations for the initial permit to the RWQCB and any time an increase in maximum RWC has been proposed but not addressed in a prior public hearing. Prior to the public hearing, the project sponsor shall provide the Department, for review and approval, the information the project sponsor intends to present at the hearing and on the Internet. Following the Department's approval of the information, the project sponsor shall:

- (1) Place the information on the Internet and in a repository that provides at least thirty days of public access to the information prior to the public hearing, and
- (2) Prior to placing the information in the repository, notify the public of;
 - (A) the location and hours of operation of the repository,
 - (B) the Internet address where the information may be viewed,
 - (C) the purpose of the repository and public hearing,
 - (D) the manner in which the public can provide comments, and
 - (E) the date, time, and location of the public hearing.

(d) Unless directed otherwise by the Department, the public notification made pursuant to subsection (c)(2) shall be by one or more of the following methods delivered in a manner to reach persons whose source of drinking water may be impacted by the GRRP:

- (1) Local newspaper(s) publication
- (2) Mailed or direct delivery of a newsletter
- (3) Conspicuously placed statement in water bills
- (4) Television and/or radio

(e) Each GRRP shall maintain, and make available for Department and/or RWQCB review when requested, an operations plan that describes the operations, maintenance, and monitoring performed to meet the requirements of this chapter. The project sponsor is responsible for ensuring that the operations plan is, at all times, representative of the current operations, maintenance, and monitoring of the GRRP.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.010. Control of Pathogenic Microorganisms.

(a) For each GRRP, the wastewater to be used as recycled water shall be treated to meet the following:

- (1) The definition of filtered wastewater, pursuant to section 60301.320; and
- (2) The definition of disinfected tertiary recycled water, pursuant to Section 60301.230.

(b) If the recycled water being used for surface spreading or subsurface injection has not been treated to meet the criteria in sections 60301.230 and 60301.320, pursuant to section 60321 (Sampling and Analysis), the GRRP shall:

- (1) Suspend surface spreading or subsurface injection of the recycled water until the criteria are met; and
- (2) Inform the Department and the RWQCB in the next monthly report.

(c) For a surface spreading project, all the recycled water shall be retained underground for a minimum of six months prior to extraction for use as a drinking water supply, and shall not be extracted within 500 feet of any GRRP surface spreading area.

(d) For a subsurface injection project, all the recycled water shall be retained underground for a minimum of twelve months prior to extraction for use as a drinking water supply, and shall not be extracted within 2000 feet of any GRRP subsurface injection well.

(e) To reduce the distance in subsection 60320.010(c) or (d), the project sponsor shall demonstrate to the Department and RWQCB that the required retention time can be achieved at the proposed reduced distance and that the requirements of Section 60320.070 (a) can be met.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.020. Control of Nitrogen Compounds.

To demonstrate control of the nitrogen compounds in the recycled water, the project sponsor shall meet the requirements of one of the methods set forth in subsections (a), (b), or (c). (These requirements are summarized in a table at the end of this document, see ENDNOTE 7)

(a) Method 1:

- (1) Each week, at least three days apart as specified in an operations plan, two samples (grab or 24-hour composite) of recycled water, or the blend of recycled water and diluent water, prior to surface spreading or subsurface injection, shall be collected. Vadose zone or mound monitoring shall be

representative of the recycled water and diluent water applied at the GRRP subsurface injection facility or throughout the spreading area and shall be performed prior to the water reaching the regional groundwater table.

(2) Samples collected pursuant to subsection (a)(1) shall be analyzed for total nitrogen, with the laboratory being required to complete each analysis within 72 hours and report the result to the project sponsor within the same 72 hours if the result of any single sample exceeds 5 mg/L.

(A) If the average of two consecutive samples exceeds 5 mg/L total nitrogen, the cause shall be investigated, appropriate actions to reduce the total nitrogen levels shall be taken, and the Department and the RWQCB shall be notified within 48 hours of being notified by the laboratory.

(B) If the average of all samples collected during any consecutive four weeks exceeds 5 mg/l, or if more than 25 percent of the samples collected in any two-week period exceed a total nitrogen concentration of 10 mg/L, the surface spreading or subsurface injection of recycled water shall be suspended. Surface spreading or subsurface injection shall not resume until appropriate corrections are made to reduce total nitrogen levels to below 5 mg/l.

(b) Method 2:

(1) At a frequency approved by the Department and specified in the operations plan prepared pursuant to Section 60320(e):

(A) samples shall be collected and analyzed for dissolved oxygen (DO) in the groundwater.

(B) samples (grab or 24-hour composite) of the recycled water or the blend of recycled water and diluent water shall be collected and analyzed for total nitrogen, nitrate, nitrite, ammonia, organic nitrogen, DO, and BOD. The samples shall be collected:

- (i) prior to subsurface injection or surface spreading, or
- (ii) from within a vadose zone or mound prior to reaching the ground water table.

(2) The laboratory shall be required to complete each analysis in (b)(1) within 72 hours and shall report the result(s) to the project sponsor within the same 72 hours if:

(A) the total nitrogen exceeds 10 mg/L, or

(B) the concentration of any constituent exceeds the respective limit identified in the engineering report.

(3) If the average of two consecutive samples exceeds 10 mg/L total nitrogen or a limit identified in the engineering report for another constituent, the cause shall be investigated, appropriate actions to meet the limit(s) shall be taken, the Department and the RWQCB shall be notified within 24 hours of being notified by the laboratory, and surface spreading or subsurface injection of recycled water shall be suspended until an average of two consecutive samples meets the limit(s).

(c) Method 3:

(1) In the engineering report prepared pursuant to section 60323, evidence shall be provided that:

(A) it is possible to track the movement of water from the GRRP surface spreading or subsurface injection facility to the downgradient extraction point(s) and

(B) surface spreading or subsurface injection has not resulted in, and would not result in, an exceedance of the nitrate or nitrite MCLs at any downgradient extraction point(s). At a minimum, the evidence shall consist of at least 10 years of the most recent data in which the nitrogen concentration was at least 75 percent of anticipated and historical maximum nitrogen concentrations.

(2) At the frequency specified in the operations plan prepared pursuant to subsection 60320(e), two grab samples of groundwater at each sampling location downgradient of the GRRP spreading area or subsurface injection facility shall be collected and analyzed for nitrite and nitrate. The laboratory shall be required to complete each analysis within 72 hours and shall report any result exceeding the nitrate or nitrite MCL to the project sponsor within the same 72 hours.

(A) If the average of two consecutive samples exceeds an MCL at any sampling location, the Department and RWQCB shall be notified and, unless the GRRP demonstrates to the Department and RWQCB that the groundwater no longer exceeds the MCL, the surface spreading or subsurface injection of recycled water shall be suspended.

(d) The GRRP may apply for reduced total nitrogen or nitrate/nitrite monitoring if all results for the previous two years did not exceed;

(1) 5 mg/L total nitrogen and one-half the nitrate and nitrite MCL for Method 1, or

(2) 10 mg/L total nitrogen and one-half the nitrate and nitrite MCL for Method 2.

(e) If a GRRP implementing reduced monitoring pursuant to subsection (d) exceeds the total nitrogen, nitrate, or nitrite concentrations in (d)(1) or (d)(2), the GRRP shall revert to the monitoring for total nitrogen, nitrate, and nitrite pursuant to subsections (a) or (b).

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.030. Control of Regulated Chemicals and Physical Characteristics.

(a) The recycled water shall be in compliance with the following:

(1) Primary maximum contaminant levels specified in chapter 15: Inorganic chemicals in table 64431-A (except for nitrogen compounds); radionuclides in sections 64442 and 64443; and organic chemicals in table 64444-A (See Endnote 1)

(2) MCLs for disinfection byproducts in section 64533, chapter 15.5;

(3) Action levels in section 64678 for lead (0.015 mg/L) and copper (1.3 mg/L); and

(4) Secondary MCLs for the constituents and characteristics in tables 64449-A and B ("Upper" levels), chapter 15, with the exception of color.

(b) Quarterly, during the same month (first, second, or third) of each quarter as specified in the GRRP's operations plan, the GRRP shall collect grab samples representative of the applied recycled water to determine compliance with paragraphs (a)(1), (2), and (3). The GRRP shall determine compliance on the basis of a running quarterly average, calculated each calendar quarter using the previous four quarters of data. If the recycled water is out of compliance, the GRRP shall implement corrective actions and, in the next quarterly report to RWQCB with a copy provided to the Department, describe the reason(s) for the non-compliance and the corrective actions taken.

(c) Each year, the GRRP shall collect a representative grab sample of the recycled water to determine compliance with paragraph (a)(4) of this section. If the single sample result or average of samples collected during the year exceeds a secondary MCL, the GRRP shall inform the Department and RWQCB and describe in the next monthly report the cause of the exceedance(s) and the corrective actions taken.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.035. Diluent Water Requirements.

To be credited with diluent water to be used in calculating an RWC to meet the requirements of section 60320.041, the project sponsor shall:

(a) Monitor the diluent water quarterly for nitrate and nitrite and, within 48 hours of being informed by the laboratory of a nitrate or nitrite result exceeding an MCL, collect a confirmation sample. If the average of the two samples is greater than an MCL;

(1) notify the Department and the RWQCB within 48 hours of receiving the confirmation sample result,

(2) investigate the cause(s) and implement corrective actions, and

(3) each week, collect and analyze two grab samples at least three days apart as specified in an operations plan. If the average of the results for a two-week period exceeds the MCL, surface spreading or subsurface injection of the diluent water shall be suspended until corrective actions are made. Quarterly monitoring may resume if four consecutive results are below the MCL.

(b) Implement a Department-approved water quality monitoring plan for the purpose of demonstrating that the diluent water meets the water quality requirements in subsections 60320.030(a) and 60320.047(a)(1)(A). The plan

shall also include actions to be taken in the event of non-compliance with a water quality requirement.

(c) Conduct a source water evaluation of the diluent water for Department review and approval that includes, but is not limited to:

- (1) a description of the source of the diluent water,
- (2) delineation of the origin and extent of the diluent water,
- (3) the susceptibility of the diluent water to contamination,
- (4) the identification of known or potential contaminants, and
- (5) an inventory of the potential sources of diluent water contamination.

(d) Develop a plan that provides a means for accurately determining the volume of diluent water to be credited, including consideration of any temporal variations, and demonstrates that the diluent water will be applied in a manner such that temporal variations in the diluent water volume will not lead to an exceedance of the maximum RWC. The plan shall be submitted to the Department for review and approval and be conducted at the frequency specified in the engineering report prepared pursuant to section 60323.

(e) Ensure the diluent water is distributed in a manner such that the maximum RWC will not be exceeded.

(f) For historical credit, not to exceed 60 months;

(1) demonstrate that the diluent water has met the nitrate and nitrite MCLs and the water quality requirements in sections 60320.030(a) and 60320.047(a)(1)(A),

(2) provide evidence that the quantity of diluent water has been accurately determined and was distributed such that the proposed or permitted maximum RWC would not have been exceeded, and

(3) conduct a source water evaluation of the diluent water pursuant to subsection (c).

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.041. Recycled Water Contribution (RWC) Requirements

(a) Each month, for each spreading area or subsurface injection facility recharged by the GRRP, the GRRP shall calculate its running monthly average (RMA) RWC based on the total volume of the recycled water and diluent water for the preceding 60 calendar months. For GRRPs in operation less than 60 months, calculation of the RMA RWC shall commence after 30 months of operation, based on the total volume of the recycled water and diluent water for the preceding months.

(b) The GRRP's RMA RWC, as determined in (a), shall not exceed the maximum RWC specified by the Department and/or RWQCB.

(c) The initial maximum RWC will be based on the Department's review of the engineering report and information obtained as a result of the public hearing, but shall not exceed 0.20 for surface spreading projects or 0.50 for subsurface injection projects.

(d) A GRRP may increase its maximum RWC, provided that:

- (1) the increase has been approved by the Department and RWQCB,
- (2) for the previous 52 consecutive weeks, the TOC 20-week running average has not exceeded the following:

$$TOC_{max} = \frac{0.5mg/L}{RWC_{proposed}}$$

Where,

RWC_{proposed} is the proposed maximum RWC

(3) the GRRP has received a permit from the RWQCB that allows operation of the GRRP at the increased maximum RWC, and

(4) the GRRP meets the requirements in subsections (e) and (f).

(e) Prior to operating a GRRP in any of the RWC ranges in Table 60320.041, the GRRP shall meet the corresponding requirements in Table 60320.041 sequentially, beginning with the range of the approved initial maximum RWC. The approval in subsection (d)(1) will be based on the Department's and the RWQCB's review of the information submitted pursuant to the corresponding RWC range in Table 60320.041 and the GRRP's history of compliance with this chapter.

Table 60320.041

GRRP RWC Operating Range Requirements For Operating Ranges A through D, where A = 0.20 ≤ RWC < 0.35 B = 0.35 ≤ RWC < 0.50 C = 0.50 ≤ RWC < 0.75 D = 0.75 ≤ RWC ≤ 1.00	RWC Operating Range			
	A	B	C	D
1. Provide documentation that a monitoring well located between the GRRP and a drinking water well has received recharge water from the GRRP for at least six months such that: <ul style="list-style-type: none"> A. the fraction of recycled water of GRRP origin in the groundwater at a monitoring well equals a value of at least 0.60 multiplied by RWC_{proposed} and, B. the GRRP recharge water is present in a monitoring well 	✓	✓	✓	✓

located in each aquifer intended to convey such water to drinking water wells.				
2. The extracted groundwater meets all drinking water standards and the requirements of section 60320.020 (Control of Nitrogen Compounds).	✓	✓	✓	✓
3. Provide a proposal to the Department prepared and signed by an engineer registered in California and experienced in the fields of wastewater treatment and public water supply. The proposal shall include:		✓	✓	✓
A. GRRP operations, monitoring, and compliance data;		✓	✓	✓
B. A demonstration that includes physical evidence that recharge water having a minimum RWC of 0.4 has been applied at the GRRP such that at least one monitoring well has received the 0.4 RWC recharge water for at least one year and the GRRP has a history of compliance with its maximum RWC limit(s);			✓	
C. A demonstration that includes physical evidence that recharge water having a minimum RWC of 0.7 has been applied at the GRRP such that at least one monitoring well has received the 0.7 RWC recharge water for at least one year and the GRRP has a history of compliance with its maximum RWC limit(s);				✓
D. A demonstration that the water collected at the monitoring wells used in the demonstration in (3)(B) and/or (3)(C) meets all the primary drinking water maximum contaminant levels;			✓	✓
E. Validation of appropriate construction and siting of monitoring wells pursuant to section 60320.070.		✓	✓	✓
F. A scientific peer review by an advisory panel that includes, as a minimum, a toxicologist, a registered engineering geologist or hydrogeologist, an engineer registered in California and experienced in the fields of wastewater treatment and public water supply, a microbiologist, and a chemist.			✓	✓
G. Submittal of an updated engineering report and operations plan.	✓	✓	✓	✓
4. Provide reverse osmosis treatment as well as subsequent advanced oxidation treatment such that, at minimum, a 1.2 log NDMA reduction and 0.5 log 1,4-dioxane reduction is achieved. ¹			✓	✓
5. Analyze the recycled water for tentatively identified compounds (TIC) and report the results to the Department. Every year thereafter, the GRRP shall have a TIC analysis performed on the recycled water.			✓	✓

1. The log reduction achieved shall be demonstrated with N-nitrosodimethylamine (NDMA) and 1,4-dioxane post-treatment concentrations that are no greater than 0.01 µg/L and 3.0 µg/L, respectively.

- (f) If the RMA RWC exceeds its maximum RWC, the GRRP shall:
- a. Notify the Department and RWQCB in writing within 7 days of exceedance and,

b. Within 60 days, implement corrective action(s) and submit a report to the Department and RWQCB describing the reason(s) for the exceedance and the corrective action(s) taken to avoid future exceedances.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.045. Total Organic Carbon Requirements

(a) For each spreading area or subsurface injection facility recharged by the GRRP, the GRRP shall monitor TOC as follows:

(1) For filtered wastewater, unless subsequently treated with reverse osmosis, two 24-hour composite samples a week, taken at least three days apart. Based on the Department's review of the previous 12 months' results, with approval from the Department, monitoring may be reduced to one 24-hour composite sample each week, and

(2) For recycled water, at least one 24-hour composite sample each week prior to recharge, or

(3) For recycled water in a vadose zone or mound, at least one sample each week in a manner yielding TOC values representative of the recycled water TOC after soil treatment and not influenced by diluent water as determined by:

(A) measuring undiluted percolating recycled water,

(B) measuring diluted percolating recycled water and adjusting the value for the diluent water effect, or

(C) using recharge demonstration studies to develop a soil treatment factor that can be applied weekly to recycled water measurements leaving the treatment plant.

(b) Grab samples may be taken in lieu of the 24-hour composite samples required in subsection (a) if:

(1) the GRRP demonstrates that a grab sample is representative of the water quality throughout a 24-hour period, or

(2) the entire recycled water stream has been treated by reverse osmosis

(c) All samples shall be analyzed for TOC by a laboratory certified by the Department to perform TOC analyses using a method designated by the Department.

(d) Analytical results of the monitoring performed pursuant to subsection (a) shall not exceed the following TOC limits:

(1) For filtered wastewater, 16 mg/L, based on:

(A) two consecutive samples and

(B) the average of the last four results and,

(2) Except as provided in subsection (e), for recycled water or vadose zone or mound monitoring, with RWC determined pursuant to section 60320.041(a),

$$\text{TOC}_{\max} = \frac{0.5 \text{ mg / L}}{\text{RWC}}, \text{ based on:}$$

- (A) a 20-week running average of all TOC results and
- (B) the average of the last four results.

(e) The TOC_{\max} limit specified in subsection (d)(2) may be increased if:

(1) The increased TOC_{\max} limit is approved by the Department and RWQCB,

(2) The GRRP has been in operation for the most recent ten consecutive years,

(3) The project sponsor submits a proposal to the Department prepared and signed by an engineer registered in California and experienced in the fields of wastewater treatment and public water supply. The proposal shall include the following, based on the most recent ten consecutive years of operation:

(A) GRRP operations, monitoring, and compliance data;

(B) Evidence that the GRRP has a history of compliance with the condition of their RWQCB permit;

(C) Evidence that the water collected at all downgradient drinking water wells and monitoring wells impacted by the GRRP has met all the primary drinking water standards for the parameters specified pursuant to section 60320.070(b)(2);

(D) Analytical or treatment studies requested by the Department to make the determination in subsection (C);

(E) Validation of appropriate construction and siting of monitoring wells pursuant to section 60320.070;

(F) A study defining the water quality changes, including organic carbon characterization, as a result of the impact of the GRRP;

(G) A health effects study, including an exposure assessment, approved by an independent scientific peer review advisory panel that includes, as a minimum; a toxicologist, an engineering geologist or hydrogeologist registered in California, an engineer registered in California and experienced in the fields of wastewater treatment and public water supply, a microbiologist, and a chemist, and

(4) The GRRP analyzes its recycled water every five years for tentatively identified compounds (TIC) and reports the result to the Department.

(f) If the GRRP exceeds the limit in (d)(1)(A), (d)(2)(A), or its approved increased TOC_{\max} limit obtained pursuant to subsection (e) based on a 20-week running average, the GRRP shall:

(1) immediately suspend the addition of recycled water until at least two consecutive results, 3 days apart, are less than the limit,

(2) notify the Department and RWQCB within 7 days of suspension,

(3) revert back to the semi-weekly monitoring in (a)(1), if the GRRP had been approved for reduced monitoring, and

(4) within 60 days, submit a report to the Department and RWQCB describing the reasons for the exceedance and the corrective actions to avoid future exceedances. At a minimum, the corrective actions shall include:

- (A) a reduction of RWC sufficient to comply with the limit, and/or
- (B) the treatment of the filtered wastewater with reverse

osmosis.

(g) If the GRRP exceeds the limit in (d)(1)(B), (d)(2)(B), or its approved increased TOC_{max} limit obtained pursuant to subsection (e) based on the last four results, the GRRP shall, within 60 days, submit a report to the Department and RWQCB describing the reasons for the exceedance and the corrective actions taken to avoid future exceedances.

(h) To use one or more wastewater constituents in lieu of TOC, approval from the Department shall be obtained. At a minimum, the constituent(s) used in lieu of TOC shall:

- (1) Be quantifiable in the wastewater, recycled water, groundwater, and throughout the treatment processes,
- (2) Have identifiable treatment performance standards as protective of public health as the TOC standards in this Chapter.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.047. Additional Constituent Monitoring

(a) The GRRP shall conduct the following monitoring and report any detections to the Department and the RWQCB in the next monthly report:

(1) Each quarter, the GRRP shall sample and analyze the recycled water for:

- (A) Unregulated chemicals in table 64450, chapter 15;
- (B) Priority Toxic Pollutants [chemicals listed in the Water Quality Standards, Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California, and 40 CFR Part 131, Federal Register 65(97), May 18, 2000, p. 31682];

(C) Chemicals with state notification levels that the Department has specified (see Endnote 3), based on a review of the GRRP engineering report and the affected groundwater basin(s); and

(D) Other chemicals that the Department has specified (See Endnote 4), based on a review of the GRRP engineering report and the affected groundwater basin(s).

(2) Based on the Department's review of the results of the monitoring in (1), with Department approval, the GRRP may reduce monitoring for the constituents in this section to once each year.

(3) Annually, the GRRP shall monitor the recycled water for pharmaceuticals, endocrine disrupting chemicals, and other indicators of the presence of municipal wastewater as specified by the Department (See Endnote 5), based on a review of the GRRP engineering report and the affected groundwater basin(s).

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.065. Operation Optimization.

(a) During the first year of operation for new GRRP's, or during the first year of operation after the effective date of this section for existing GRRP's, and at all times thereafter, all treatment processes shall be operated in a manner providing optimal reduction of all contaminants including:

- (1) microbial contaminants,
- (2) regulated contaminants identified in Section 60320.030, and
- (3) nonregulated contaminants identified in Section 60320.047.

(b) Within six months of optimizing treatment processes pursuant to (a) and anytime thereafter operations are optimized resulting in a change in operation, each GRRP shall update their operations plan to include such changes in operational procedures and submit the operations plan to the Department for review.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.070. Monitoring Between GRRP and Downgradient Drinking Water Supply Wells.

(a) Prior to operating a GRRP, each GRRP shall site and construct monitoring wells, as follows:

- (1) At a location between one and three months travel time from the surface spreading or subsurface injection area,
- (2) At an additional point or points between the surface spreading or subsurface injection area and the nearest downgradient domestic water supply well, and
- (3) Such that samples can be obtained independently from each aquifer potentially conveying the water that was recharged by the GRRP.

(b) Monitoring shall be conducted as follows:

- (1) Two samples prior to GRRP operation and at least one sample each quarter thereafter, shall be collected at each monitoring well;
- (2) Each sample shall be analyzed for TOC, total nitrogen, nitrate, nitrite, the constituents in tables 64449-A and B of section 64449, total coliform bacteria,

and any water quality constituents specified by the Department based on the results of the recycled water monitoring conducted pursuant to this chapter; and

(c) Analytical results of monitoring performed pursuant to paragraph (b) shall be reported to the Department and the RWQCB by the GRRP, as follows:

(1) For all chemical analyses completed in a calendar month, no later than the end of the following month using the Electronic Deliverable Format as defined in The Electronic Deliverable Format (EDF) Version 1.2i Guidelines & Restrictions dated April 2001 and Data Dictionary dated April 2001.

(2) For any results exceeding an MCL or at anytime coliform bacteria are present, within 48 hours of receiving the results.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

Section 60320.090. Annual and Five-Year Reporting.

(a) By March 1 of each year, the project sponsor shall provide a report to the RWQCB, the Department, and all public water systems having downgradient sources potentially affected by the GRRP. The report shall be prepared by an engineer registered in California and experienced in the fields of wastewater treatment and public water supply. Based on the previous calendar year's operation, the report shall include the following:

(1) A summary of compliance with the applicable monitoring requirements and criteria of this Chapter;

(2) For any violations of this Chapter;

(A) the date, duration, and nature of the violation

(B) a summary of any corrective actions and/or suspensions of surface spreading or subsurface injection of recycled water resulting from a violation

(C) if uncorrected, a schedule for and summary of all remedial actions

(3) Any detections of monitored constituents and any observed trends in the monitoring wells,

(4) Information pertaining to the vertical and horizontal migration of the recycled/diluent water plume,

(5) A description of any changes in the operation of any unit processes or facilities, and

(6) A description of any anticipated changes, along with an evaluation of the expected impact of the changes on subsequent unit processes.

(b) Every five years from the date of the initial approval the engineering report required pursuant to section 60323, the project sponsor shall update the report to address any project changes and submit the report to the RWQCB and the Department. The update shall include, but not be limited to:

(1) Anticipated RWC increases, a description of how the RWC requirements in section 60320.041 will be met, and the expected impact the increase will have on the GRRP's ability to meet the requirements of this Chapter,

(2) Evidence that the minimum retention time requirements in subsection 60320.010(c) or (d) have been met, and

(3) A description of any inconsistencies between previous groundwater model predictions and the observed and/or measured values, as well as a description of how subsequent predictions will be accurately determined.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

ARTICLE 7. ENGINEERING REPORT AND OPERATIONAL REQUIREMENTS

Section 60323. Engineering Report

(a) No person shall produce or supply ~~reclaimed~~ recycled water for direct reuse from a ~~proposed~~ water reclamation plant ~~unless he files~~ without an Department approved engineering report.

(b) The report shall be prepared by a properly qualified engineer registered in California and experienced in the field of wastewater treatment, and shall contain a description of the design of the proposed reclamation system. The report shall clearly indicate the means for compliance with these regulations and any other features specified by the regulatory agency.

(c) The report shall contain a contingency plan which will assure that no untreated or inadequately treated wastewater will be delivered to the use area.

NOTE: Authority cited: Section 100275, Health and Safety Code and Section 13521, Water Code. Reference: Section 13520, Water Code.

ENDNOTES *[These endnotes are not part of the draft regulations, but are included to provide readers with additional information and guidance about the intended application of the draft regulations, and the specific contaminants that are or may be involved.]*

ENDNOTE 1. New Regulated Contaminants.

New state and federal MCLs will be added as they are adopted (e.g., perchlorate, chromium-6)

ENDNOTE 2. Analytical Methods for Unregulated Chemicals.

GRRPs should select methods for nonregulated chemicals according to the following approach:

- *Use drinking water methods, if available.*
- *Use CDHS-recommended methods for chemicals in subsection (f) (e.g., 1,2,3-TCP).*
- *If there is no DHS-recommended drinking water method for a chemical, and more than a single EPA-approved method is available, use the most sensitive of the EPA-approved methods (e.g., nitrosamines).*
- *If there is no EPA-approved method for a chemical, and more than one method is available from the scientific literature (e.g., peer-reviewed journals), after consultation with DHS, use the most sensitive method.*
- *If no approved method is available for a specific chemical, the GRRP's laboratory may develop or use its own methods and should provide the analytical methods to CDHS for review. Those methods may be used until CDHS-recommended or EPA-approved methods are available.*
- *If the only method available for a chemical is for wastewater analysis (e.g., a chemical listed as a priority pollutant only), sample and analyze for that chemical in the treated wastewater immediately prior to reverse osmosis treatment to increase the likelihood of detection. Use this approach until the GRRP's laboratory develops a method for the chemical in drinking water, or until a CDHS-recommended or EPA-approved drinking water method is available.*

ENDNOTE 3. Selected chemicals with CDHS advisory levels for possible analysis.

These chemicals are selected from CDHS' chemicals with notification levels; chemicals already included in analysis required under subsections (f)(1)(A) or (B) are not included here. These chemicals have either been detected at least once in drinking water supplies, or if not detected, they are of interest for some specific reason [e.g., formaldehyde is of interest because it may be a byproduct

of certain treatment processes]. They: include *n*-butylbenzene, *sec*-butylbenzene, *tert*-butylbenzene, carbon disulfide, chlorate, 2-chlorotoluene, 1,4-dioxane, formaldehyde, isopropylbenzene, *n*-propylbenzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene. They also include certain nitrosamines, discussed in Endnote 4.

ENDNOTE 4. Additional chemicals for analysis

Diazinon has been moved from the list of chemicals with notification levels to the list of archived advisory levels. Nevertheless, CDHS continues to include analysis for *diazinon* in this section. Monitoring for nitrosoamines also continues, because of the CDHS' experience with *N*-nitrosodimethylamine (NDMA) and other nitrosamines. For example, NDMA has been introduced into groundwater via a recycled water recharge project. CDHS has established notification levels for NDMA, *N*-nitrosodiethylamine (NDEA), and *N*-nitrosodi-*n*-propylamine (NDPA). NDMA and NDPA are priority pollutants, along with another nitrosamine, *N*-nitrosodiphenylamine. Nitrosamines with EPA methods for drinking water are NDEA, NDMA, NDPA, *N*-Nitrosdi-*n*-butylamine (NDBA), *N*-Nitrosomethylethylamine (NMEA), *N*-Nitrosopiperidine (NPIP), and *N*-Nitrosopyrrolidine (NYPR).

ENDNOTE 5. Endocrine disrupting and other chemicals.

CDHS has specified the following endocrine disrupting chemicals, pharmaceuticals, personal care products, and other "indicator" chemicals for monitoring:

- *Hormones: Ethinyl estradiol, 17-B estradiol, estrone*
- *"Industrial" endocrine disruptors: bisphenol A, nonylphenol and nonylphenol polyethoxylate, octylphenol and octylphenol polyethoxylate, polybrominated diphenyl ethers.*
- *Pharmaceuticals and others substances: acetaminophen, amoxicillin, azithromycin, caffeine, carbamazepine, ciprofloxacin, ethylenediamine tetra-acetic acid (EDTA), gemfibrozil, ibuprofen, iodinated contrast media, lipitor, methadone, morphine, salicylic acid, and triclosan.*

These samples are being collected for information purposes; there are no standards for the contaminants listed below and no standards are anticipated at this time and analytical methods may not be widely available (See Endnote 2).

Some interested parties have asked for some clarification of what would happen if any of these contaminants are found. In response, we offer this: Monitoring for these chemicals is viewed as a diligent way of assessing and verifying recycled water quality characteristics, which can be useful in addressing issues of public perception about the safety of recharge projects. Further, should there be a positive finding, the recharge agency and CDHS can give the result due consideration as to whether it is of concern or not. Just what such consideration might entail would depend on what is known and what is not known about the

particular chemical, including its potential health effects at the given concentration, the source of the chemical, as well as possible means of better control to limit its presence, treatment strategies if necessary, and other appropriate actions.

Again, we stress that such monitoring is not for compliance purposes, but for informational use only.

The specific contaminants targeted for monitoring may vary among GRPPs, depending on their individual engineering reports and characteristics of their groundwater basins. If a GRPP has additional reports for its own project using prior data that address chemicals identified in these Endnotes, or reports for its own project using data on other chemicals addressing the effectiveness of the treatment processes in limiting the release of endocrine disruptor, pharmaceuticals, or personal care chemicals into recharge water, those reports should be made available to CDHS to assist in developing a list of chemicals that would build upon or supplement the already available information. A GRPP that has little monitoring information should plan on collecting more analytical data related to endocrine disrupting chemicals, pharmaceuticals, personal care products and other indicator chemicals in its recharge water. A GRPP that can demonstrate a history sampling, analysis, and related research—as well as an on-going program of monitoring and research—on endocrine disrupting chemicals, pharmaceuticals and personal care products, or other indicator chemicals in its recharge water will likely have fewer contaminants specified by CDHS for analysis under this section.

GRPPs will not be required to conduct an ongoing monitoring program for contaminants under this section, unless good indicator chemicals can be identified through this monitoring. Depending on the results of analyses and other information discussed above, required monitoring may be of short duration (e.g., twice a year for two or three years). If good indicator chemicals can be identified, requirements for their monitoring will be considered. This notwithstanding, CDHS recommends an ongoing monitoring program for these types of chemicals.

ENDNOTE 6. Advanced oxidation treatment

The current draft proposes establishing log reduction of targeted chemicals rather than specifying a specific treatment scheme and/or dosage for achieving advanced oxidation. However, CDHS is considering how to implement a requirement for achieving advanced oxidation that would be effective. CDHS continues to seek ideas on how this should be regulated.

ENDNOTE 7. Table summarizing text of Section 60320.020 (Control of Nitrogen Compounds)*

	Method 1	Method 2	Method 3
Compliance point and monitoring	<ul style="list-style-type: none"> Recycled water, or a blend of recycled water and diluent water, in or above the mound Samples analyzed for total nitrogen Reduced monitoring available 	<ul style="list-style-type: none"> Recycled water or a blend of recycled water and diluent water either: <ul style="list-style-type: none"> prior to surface spreading or subsurface injection, or from within a mound or vadose zone prior to reaching the GW table Samples analyzed for total nitrogen, nitrate, nitrite, ammonia, organic nitrogen, DO, and BOD Reduced monitoring available 	<ul style="list-style-type: none"> Groundwater downgradient of the recharge area Samples analyzed for nitrate and nitrite
Standard(s)	<ul style="list-style-type: none"> 5 mg/L total N as an average 10 mg/L total N as a maximum frequency 	<ul style="list-style-type: none"> 10 mg/L total nitrogen or Limits established in the engineering report for other constituent 	MCLs for nitrate and nitrite
Frequency of sampling	2 per week	As established by the Department and specified in the operations plan	<ul style="list-style-type: none"> Specified in the engineering report and operations plan. Relatively frequent monitoring at locations between the recharge area and down gradient domestic wells is required.
Consequence of failure	<ul style="list-style-type: none"> Investigate, correct and notify if the average of two consecutive samples >5 mg/L Suspend recharge of recycled water if the 4-week average of all samples >5 mg/L <u>or</u> if more than 25% of samples collected in any two week period exceed 10 mg/L. 	<ul style="list-style-type: none"> Investigate, correct and notify based on an average of two consecutive samples over the total nitrogen standard or standard for another constituent. Suspend surface spreading and subsurface injection of recycled water until the average of two consecutive samples meets all limits 	<ul style="list-style-type: none"> Notify the Department and RWQCB. Suspend surface spreading and subsurface injection unless demonstrated that the groundwater no longer exceeds the MCLs.
Rationale	Method 1 relies on such a low limit for the total N in the recycled water that the chance that the NO ₂ or NO ₃ MCL could be exceeded is minute.	Method 2 relies on: <ol style="list-style-type: none"> A low enough limit for the total N in the recycled water that the chance that a NO₂ or NO₃ MCL could be exceeded is low, combined with A set of limits determined for the specific GRRP and explained in the Engineering Report for nitrite, organic nitrogen and /or ammonia necessary to limit oxidation to NO₂ or NO₃, and some set of minimum levels for an excess DO over BOD requirement in the recycled water and/or a DO requirement in the groundwater as necessary to prevent reduction of NO₃ to NO₂ 	Method 3 relies on: <ol style="list-style-type: none"> A demonstration that historic recharge with water containing comparable levels of nitrogen has not caused a problem, Evidence that recharge water can be tracked and monitored throughout the flow path, and Monitoring to show that the MCLs in for NO₂ and NO₃ are met in the groundwater.

*Note: This table provides a *summary* of the regulatory requirements and is not intended to be comprehensive.