TO: BOARD OF DIRECTORS

FROM: BRUCE BUEL

DATE: SEPT. 19, 2008

AGENDA ITEM
E-3
SEPT. 24, 2008

AUTHORIZE COMMENTS ON STATE RECHARGE REGULATIONS

ITEM

Authorize comments on State Recharge Regulations [PROVIDE POLICY GUIDANCE].

BACKGROUND

The State Department of Public Health (DPH) has published the attached draft regulations and has requested feedback by October 31, 2008.

Staff believes that adoption of a set of regulations would minimize future controversy over recharge proposals, however, the regulations as drafted do not distinguish between discharge and recharge and do not address operations currently permitted by Discharge Order. Staff believes that the proposed regulations should be redrafted to address these issues.

Review of the draft regulations has involved staff time, which has previously been budgeted. Adoption of the Regulations could have a substantial fiscal impact.

RECOMMENDATION

Staff recommends that the Board authorize staff to submit comments proposing language "grandfathering" existing disposal governed by an Discharge Order and distinguishing between recharge and discharge.

ATTACHMENTS

- Draft DPH Recharge Regulations

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This draft reflects the California Department of Public Health (CDPH) Drinking Water Program's current thinking on the regulation of recharge of groundwater with recycled municipal wastewater.

Any comments you have on this draft can be emailed to Jeff Stone at Jeffrey.Stone@cdph.ca.gov and Mike McKibben at Michael.McKibben@cdph.ca.gov .

TITLE 22, CALIFORNIA CODE OF REGULATIONS 2

Title 22, CALIFORNIA CODE OF REGULATIONS

DIVISION 4. ENVIRONMENTAL HEALTH

CHAPTER 3. RECYCLING CRITERIA

August 5, 2008

ARTICLE 1. DEFINITIONS

Section 60301.080. 24-hour Composite Sample.

"24-hour composite sample" means an aggregate sample derived from no fewer than eight discrete samples collected at equal time intervals or collected proportional to the flow rate over the compositing period. The aggregate sample shall reflect the average source water quality covering the composite of sample period.

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 used to dilute recycled municipal 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 the saturated zone.

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 (GRRP)

"Groundwater Recharge Reuse Project (GRRP)" means a project that uses recycled municipal wastewater, 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 has been identified as a GRRP by the 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 60301.670. 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 60301.685. Recharge Water.

"Recharge Water" means either recycled municipal wastewater or the combination of recycled municipal wastewater and diluent water that is applied at a GRRP facility.

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 Municipal Wastewater.

"Recycled Municipal Wastewater" means the effluent from the treatment of a wastewater of municipal origin, suitable for a direct beneficial use or a controlled use.

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 municipal wastewater applied at the GRRP, divided by the sum of the recycled municipal wastewater applied at the GRRP 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, between, and below natural geologic materials are filled with water, with the uppermost surface of the saturated zone being the water table.

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 a natural or constructed impoundment with a depth equal to or less than its widest surface dimension used by a GRRP to recharge a groundwater basin with recharge water infiltrating and percolating through an otherwise (i.e. without the presence of recharge water) unsaturated zone.

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

Section 60301.840. Subsurface Application.

"Subsurface Application" means the controlled application of recharge water to a groundwater basin by a means other than surface application.

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

Section 60301.850. Surface Application.

"Surface Application" means the controlled application of recharge water to a 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.

Section 60301.910. Unsaturated Zone.

"Unsaturated Zone" means the volume between the land surface and the saturated zone.

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.[1]

(a) Recycled municipal wastewater 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 municipal wastewater 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 in the RWQCB permit for the GRRP.

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[1] The Department is considering the inclusion of a provision for operator certification and/or training.

(b) Prior to operation of a new GRRP, or during the first year of operation after [*insert effective date*] for an existing GRRP, the 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 subsection 60320.010(c)..

(c) A public hearing for a GRRP shall be held prior to the Department's submittal of its recommendations for the GRRP's 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 a 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 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.

(d) Prior to placing the information required pursuant to subsection (c) in a repository, the GRRP shall:

(1) Notify the public of the following;

(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.

(2) At a minimum, notify the first downgradient potable water well owner and well owners whose drinking water source is within 10 years from the GRRP based on groundwater flow directions and velocities.

(e) Unless directed otherwise by the Department, the public notification made pursuant to subsection (d)(2) shall be by direct mail and the notification made pursuant to (d)(1) 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; or

(4) Television and/or radio.

(f) Prior to operation, a new GRRP shall have an Operations Plan submitted to and approved by the Department. An existing GRRP shall maintain, and make available to the Department or RWQCB for review when requested, an

Operations Plan. An Operations Plan shall describe the operations, maintenance, and monitoring necessary for the GRRP to meet the requirements of this chapter. The project sponsor shall be responsible for ensuring that the Operations Plan is, at all times, representative of the current operations, maintenance, and monitoring of the GRRP.

(g) Prior to operating a new GRRP, the project sponsor shall collect at least two samples from each monitoring well approved pursuant to section 60320.070. The samples shall be representative of water in each aquifer, taking into consideration seasonal variations, and be analyzed for the constituents and characteristics in sections 60320.020, 60320.030, 60320.045 and 60320.47.

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

Section 60320.005 Alternatives.

(a) A GRRP may use an alternative to a requirement in this chapter if the GRRP has:

(1) demonstrated to the Department that the proposed alternative would assure at least the same level of protection to public health;

(2) received written approval from the Department prior to implementation of the alternative; and

(3) conducted a public hearing, disseminated information to the public, and received public comments, pursuant to subsections 60320(c) and (d), on the proposed alternative.

(b) Surface application GRRPs that provide reverse osmosis treatment as well as subsequent advanced oxidation treatment to the entire recycled municipal wastewater may apply to the Department for less frequent monitoring than that required in sections **XXXX**[2]. The advanced oxidation treatment shall provide, at minimum, a level of treatment equivalent to a 1.2 log N-nitrosodimethylamine (NDMA) reduction and a 0.5 log 1,4-dioxane reduction.

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

Section 60320.007 Laboratory Analyses.

(a) Analyses for contaminants having primary or secondary MCLs shall be performed by laboratories approved to perform such analyses by the Department utilizing Department-approved drinking water methods and,

[2] The applicable reduced monitoring is under discussion.

(b) Analyses for constituents other than those having primary or secondary MCLs shall be described in the GRRP's Operations Plan prepared pursuant to subsection 60320(f).

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 municipal wastewater shall be treated to meet the following:

(1) The definition of filtered wastewater, pursuant to section 60301.320[3]; and

(2) The definition of disinfected tertiary recycled water, pursuant to section 60301.230[3].

(b) If the recycled municipal wastewater being used for surface or subsurface application 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 or subsurface application of the recycled municipal wastewater until the criteria are met; and

(2) Inform the Department and the RWQCB in the next quarterly report submitted pursuant to section 60321[3].

(c) For each GRRP, the recycled municipal wastewater shall be retained underground for a minimum of six months prior to extraction for use as a drinking water supply.

(d) To demonstrate that the minimum retention time in subsection (c) has been met, prior to the end of the third month of operation (including prior to initial operation), under hydraulic conditions representative of normal GRRP operations the GRRP shall initiate a tracer study utilizing an added tracer (e.g. sulfur hexafluoride). Based the time for two percent of the tracer concentration to arrive at its endpoint from the GRRP location (T_2), the results of the tracer study shall provide evidence of;

(1) A minimum retention time of six months, with the nearest downgradient drinking water well as the endpoint or,

(2) A minimum retention time of three months, with the monitoring well sited pursuant to paragraph 60320.070(a)(1) as the endpoint.

(e) If the retention time to nearest downgradient drinking water well is less than twelve months based on the extrapolation of the results of the tracer study performed pursuant to paragraph (d)(2), the GRRP shall monitor the tracer, with

[3] Refers to existing regulations not shown in this document.

the nearest downgradient drinking water well as the endpoint, until compliance with paragraph (d)(1) has been demonstrated.

(f) Until a GRRP has demonstrated compliance with subsection (c) pursuant to subsection (d), i.e. for the purpose of siting a GRRP location during project planning, each GRRP shall be located at a distance from drinking water supply wells that ensures that one of the estimated retention times in Table 60320.010-A is met, as indicated by the corresponding method used to determine the estimated retention times.

Table 60320.010-A

Method used to estimate the retention time to the nearest downgradient drinking water well	**Minimum Estimated Retention Time**
Tracer study utilizing an intrinsic tracer based on T_{10} (i.e. the time for 10% of tracer concentration to reach the endpoint) conducted under hydraulic conditions representative of normal GRRP operations.	9 months
Numerical modeling (i.e. calibrated finite element or finite difference models using verified computer codes such as Modflow, Feflow, Sutra, Femwater, etc.)	12 months
Analytical modeling (i.e. Using existing equations such as Darcy's Law to estimate groundwater flow conditions based on simplifying aquifer assumptions)	24 months

(g) A method used to establish the retention times in subsections (d) or (f) shall be approved by the Department.

(h) A GRRP shall provide the Department and RWQCB a map of the GRRP site at a scale of 1:24,000 or larger (1 inch equals 2,000 feet or 1 inch equals less than 2,000 feet) or, if necessary, a site sketch at a scale providing more detail, that clearly indicates;

(A) The location and boundaries of the GRRP,

(B) The boundary representing the six-month retention time required in paragraph (c) as determined in paragraph (d) or (f), whichever is most recent, and

(C) The location of all drinking water supply wells and monitoring wells within three years of the GRRP based on groundwater flow directions and velocities expected under GRRP operating conditions.

(i) The Department may require the GRRP to demonstrate that the underground retention times required in this section are being met if changes in

hydrogeological or climatic conditions have occurred since the most recent demonstration.

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 municipal wastewater, the project sponsor shall meet the requirements of one of the methods in subsections (a), (b), or (c). Method 3, described in subsection (c), may only be utilized by a GRRP that has been in operation for a minimum of twenty years. (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 the GRRP's Operation Plan, two samples (grab or 24-hour composite) representative of the recycled municipal wastewater or recharge water applied throughout the spreading area or subsurface application area shall be collected. Samples may be collected before or after surface or subsurface application.

(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 have the result reported 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 the GRRP being notified by the laboratory.

(B) If the average of all samples collected during any consecutive four weeks exceeds 5 mg/L, the surface or subsurface application of recycled municipal wastewater shall be suspended. Surface or subsurface application shall not resume until appropriate corrective actions are made and two consecutive total nitrogen samples are less than 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(f):

(A) samples shall be collected and analyzed for dissolved oxygen (DO) in the groundwater that has been blended with the recharge water and;

(B) samples (grab or 24-hour composite) representative of the recycled municipal wastewater or recharge water shall be collected and analyzed for nitrate, nitrite, ammonia, organic nitrogen, DO, and BOD.

(2) The GRRP shall ensure that the laboratory completes each analysis in (b)(1) within 72 hours (one week for BOD) and report the result(s) to the project sponsor within the same 72 hours (one week for BOD) 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 and approved by the Department.

(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 the GRRP being notified by the laboratory, and surface or subsurface application of recycled municipal wastewater 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 recharge water from the GRRP surface or subsurface application facility to downgradient potable water wells located within 20 years of the GRRP based on groundwater flow directions and velocities,

(B) the most recent year's total nitrogen levels in the recycled municipal wastewater is not greater than the most recent 10 years of historical data, and

(C) surface or subsurface application has not resulted in, and would not result in, an exceedance of the nitrate or nitrite MCLs at any downgradient potable water wells located within 20 years of the GRRP based on groundwater flow directions and velocities. At a minimum, the evidence shall consist of at least the most recent 10 years of historical data, and shall demonstrate that no potable water well, as a result of the operation of the GRRP:

1. exceeded the nitrate or nitrite MCLs or
2. has had a trend of increasing concentrations of nitrate or nitrite that would lead to a nitrate or nitrite MCL exceedance utilizing the GRRP's current operations.

(2) At the frequency specified in the operations plan prepared pursuant to subsection 60320(f), two grab samples of groundwater at each sampling location downgradient of the GRRP's surface or subsurface application facility shall be collected and analyzed for nitrite and nitrate. The GRRP shall ensure that the laboratory completes 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 or subsurface application of recycled municipal wastewater shall be suspended.

(d) The GRRP may apply for reduced total nitrogen or nitrate/nitrite monitoring frequencies 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 frequencies for total nitrogen, nitrate, and nitrite prior to the frequency being reduced.

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) Each calendar quarter, as specified in the GRRP's operations plan, the GRRP shall collect grab samples representative of the applied recycled municipal wastewater and have the samples analyzed for the contaminants listed below.

(1) The inorganic chemicals in Table 64431-A, except for nitrogen compounds;

(2) The radionuclide chemicals in Tables 64442 and 64443;

(3) The organic chemicals in Table 64444-A;

(4) The disinfection byproducts in Table 64533-A; and

(5) Lead and copper.

(b) Recharge water may be monitored in lieu of recycled municipal wastewater to satisfy the monitoring requirements in paragraph (a)(4) if the fraction of recycled municipal waste water in the recharge water is equal to or greater than the average fraction for the quarter. If the fraction of recycled municipal waste water in the recharge water being monitored is less than the average fraction applied for the quarter, the reported value shall be adjusted to account for any dilution.

(c) Each year, the GRRP shall collect at least one representative grab sample of the recycled municipal wastewater and have the sample(s) analyzed for the secondary drinking water constituents in Tables 64449-A and 64449-B.

(d) If a result of the monitoring performed pursuant to subsection (a) exceeds a contaminant's MCL or action level (for lead and copper), the GRRP shall collect another sample and have it analyzed for the contaminant as confirmation within 72 hours.

(1) For a contaminant whose compliance with its MCL is not based on a running annual average (see Endnote 1), if the average of the initial and confirmation sample exceeds the contaminant's MCL, or the confirmation sample

is not collected and analyzed pursuant to this subsection, the GRRP shall notify the Department and RWQCB within 24 hours and initiate weekly monitoring until four consecutive weekly results are below the contaminant's MCL.

(A) If the running four-week average exceeds the acute contaminant's MCL, the GRRP shall notify the Department and RWQCB within 24 hours and, if directed by the Department or RWQCB, suspend application of the recycled municipal wastewater.

(2) For a contaminant whose compliance with its MCL is based on a running annual average, if the average of the initial and confirmation sample exceeds the contaminant's MCL or action level, or a confirmation sample is not collected and analyzed pursuant to this subsection, the GRRP shall initiate weekly monitoring for the contaminant until the running four-week average no longer exceeds the contaminant's MCL or action level.

(A) If the running four-week average exceeds the contaminant's MCL or action level, the GRRP shall describe the reason(s) for the exceedance and provide a schedule for completion of corrective actions in the next quarterly report submitted to RWQCB pursuant to section 60321, with a copy provided to the Department.

(B) If the running four-week average exceeds the contaminant's MCL or action level for sixteen weeks, the GRRP shall notify the Department and RWQCB within 24 hours and, if directed by the Department or RWQCB, suspend application of the recycled municipal wastewater.

(e) With the exception of color, if an annual result of the monitoring performed pursuant to (c) exceeds a constituent's secondary MCL in Table 64449-A or the upper limit in Table 64449-B, the GRRP shall initiate quarterly monitoring of the municipal wastewater for the constituent and, if the running annual average of quarterly results exceeds a constituent's secondary MCL or upper limit, describe the reason(s) for the exceedance and any corrective actions taken in the next quarterly report submitted to RWQCB pursuant to section 60321, with a copy provided to the Department. The annual monitoring in (c) may resume if the running annual average of quarterly results does not exceed a constituent's secondary MCL or upper limit.

(f) If four consecutive quarterly results for asbestos are below the detection limit for asbestos, monitoring for asbestos may be reduced to one sample every three years. Quarterly monitoring shall resume if asbestos is detected.

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 GRRP shall comply with the requirements of this section. For diluent water that is a Department approved

drinking water source, the GRRP is exempt from subsections (a) and (b). The GRRP shall:

(a) Monitor the diluent water quarterly for nitrate and nitrite and, within 72 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 or subsurface application of the diluent water shall not be used in the calculation of RWC until corrective actions are made. Quarterly monitoring may resume if four consecutive results are below the MCL.

(b) Conduct a source water evaluation per California-Nevada Section of American Water Works Association watershed sanitary survey handbook, or other Department approved 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.

(c) Implement a Department-approved water quality monitoring plan for the purpose of demonstrating that the diluent water meets Department specified primary MCLs and notification levels based on the source water evaluation performed in (b). The plan shall also include:

(1) Monitoring of any constituents listed in section 62320.047, based on the source water evaluation performed in (b), and;

(2) Actions to be taken in the event of non-compliance with a primary MCL or failing to meet a notification level.

(d) Develop a method for accurately determining the volume of diluent water to be credited, including consideration of any temporal variations, and demonstrate 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 method 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) For credit not to exceed 60 months prior to the operation of the GRRP:

(1) demonstrate that the diluent water has met the nitrate and nitrite MCLs and the water quality requirements in sections 60320.030 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 will not be exceeded, and

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

(f) In the operations plan prepared pursuant to 60320(f), include a description of:

(1) How the diluent water will be distributed in a manner that ensures that the maximum RWC will not be exceeded during normal operations; and

(2) The actions to be taken in the event the diluent water is curtailed or is no longer available.

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 surface or subsurface application facility used for replenishing a groundwater basin, the GRRP shall calculate its running monthly average (RMA) RWC based on the total volume of the recycled municipal wastewater 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 municipal wastewater 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.

(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;

(1) 0.50 for subsurface application GRRPs;

(2) 0.50 for surface application GRRPs that provide reverse osmosis treatment as well as subsequent advanced oxidation treatment to the entire recycled municipal wastewater, if the advanced oxidation[4] treatment provides, at minimum, a level of treatment equivalent to a 1.2 log NDMA reduction and a 0.5 log 1,4-dioxane reduction or;

(3) 0.20 for surface application GRRPs not meeting the criteria in paragraph (2).

[4] The requirement for advanced oxidation for **all** subsurface application GRRPs is under discussion.

(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, as monitored pursuant to section 62320.045, has not exceeded the following:

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

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 exceeding the GRRP's initial RWC, the GRRP shall meet the corresponding requirements in Table 60320.041-A or B 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-A or B and the GRRP's history of compliance with this chapter.

Table 60320.041-A
Surface Application Projects

GRRP RWC Operating Range Requirements For Operating Ranges A through E, where A = 0.00 ≤ RWC < 0.20 B = 0.20 ≤ RWC < 0.35 C = 0.35 ≤ RWC < 0.50 D = 0.50 ≤ RWC < 0.75 E = 0.75 ≤ RWC ≤ 1.00	**RWC Operating Range**				
	A	B	C	D	E
1. Provide documentation that a groundwater 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 the fraction of the GRRP's recycled municipal wastewater in the monitoring well equals a value of at least 0.5 multiplied by $RWC_{proposed}$.		✓	✓	✓	✓
2. The groundwater impacted by a GRRP from a monitoring well and a drinking water well 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 licensed in California with at least three years experience in wastewater treatment and public water supply. The proposal shall include:	✓	✓	✓	✓	✓
A. GRRP operations, monitoring, and compliance data;	✓	✓	✓	✓	✓
B. Evidence that a groundwater monitoring well located between the GRRP and a drinking water well has received recharge water from the GRRP for at least one year such that the fraction of the GRRP's recycled municipal wastewater in the monitoring well equals a value of at least 0.8 multiplied by $RWC_{maximum}$.;		✓	✓	✓	✓
C. Validation of appropriate construction and siting of monitoring wells pursuant to section 60320.070.	✓	✓	✓	✓	✓
D. A scientific peer review by an independent advisory panel that includes, as a minimum, a toxicologist, a registered engineering geologist or hydrogeologist, an engineer licensed in California with at least three years experience in wastewater treatment and public water supply., a microbiologist, and a chemist.				✓	✓
E. Submittal of an updated engineering report and operations plan.		✓	✓	✓	✓
4. At a minimum, for that portion of the recycled municipal wastewater stream needing additional treatment to meet the TOC limit in section 60320.045, provide reverse osmosis[5]	✓	✓	✓	✓	✓

[5] Performance criteria for reverse osmosis treatment is under discussion.

treatment as well as subsequent advanced oxidation treatment. The advanced oxidation treatment[6] shall provide, at minimum, a level of treatment equivalent to a 1.2 log NDMA reduction and a 0.5 log 1.4-dioxane reduction, whether NDMA or 1,4-Dioxane are present or not.					

Table 60320.041-B
Subsurface Application Projects

GRRP RWC Operating Range Requirements For Operating Ranges A through C, where A = 0.00 ≤ RWC < 0.50 B = 0.50 ≤ RWC < 0.75 C = 0.75 ≤ RWC ≤ 1.00	**RWC Operating Range**		
	A	B	C
1. Provide documentation that a groundwater 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 the fraction of the GRRP's recycled municipal wastewater in the monitoring well equals a value of at least 0.5 multiplied by $RWC_{proposed}$.		✓	✓
2. The groundwater impacted by a GRRP from a monitoring well and a drinking water well 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 licensed in California with at least three years experience in wastewater treatment and public water supply.. The proposal shall include:	✓	✓	✓
A. GRRP operations, monitoring, and compliance data;	✓	✓	✓
B. Evidence that a groundwater monitoring well located between the GRRP and a drinking water well has received recharge water from the GRRP for at least one year such that the fraction of the GRRP's recycled municipal wastewater in the monitoring well equals a value of at least 0.8 multiplied by $RWC_{maximum}$.;		✓	✓
C. Validation of appropriate construction and siting of monitoring wells pursuant to section 60320.070.	✓	✓	✓
D. A scientific peer review by an independent advisory panel that includes, as a minimum, a toxicologist, a registered engineering geologist or hydrogeologist, an engineer licensed in California with at least three years experience in wastewater treatment and public water supply., a microbiologist, and a chemist.		✓	✓
E. Submittal of an updated engineering report and operations plan.		✓	✓
4. For the entire recycled municipal wastewater stream, provide	✓	✓	✓

reverse osmosis treatment as well as subsequent advanced oxidation treatment[6]. The advanced oxidation treatment shall provide, at minimum, a level of treatment equivalent to a 1.2 log NDMA reduction and a 0.5 log 1.4-dioxane reduction.			

(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 surface or subsurface application facility used for replenishing a groundwater basin, 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 municipal wastewater, at least one 24-hour composite sample each week prior to recharge, or

(3) For surface application, at least one sample each week in a manner yielding TOC values representative of the recycled municipal wastewater TOC after infiltration and percolation, and not influenced by diluent water, native groundwater, or other source of dilution as determined by:

(A) measuring undiluted percolating recycled municipal wastewater,

(B) measuring diluted percolating recycled municipal wastewater 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 municipal wastewater 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 municipal wastewater stream has been treated by reverse osmosis.

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[6] The requirement for advanced oxidation for **all** subsurface application GRRPs is under discussion.

(c) 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) For recycled municipal wastewater or recharge water, with the running monthly average (RMA) RWC determined pursuant to section 60320.041(a),

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

(A) a 20-week running average of all TOC results and

(B) the average of the last four results.

(d) The TOC_{max} limit specified in subsection (c)(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 licensed 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 requirements 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;

(4) The GRRP has performed a health effects evaluation that assesses the health risks to consumers of water impacted by the GRRP, including any anticipated water quality changes resulting from the proposed increased TOC_{max} limit. The evaluation shall include the following:

(A) An exposure assessment that characterizes the quality of the water consumed and the quantity of contaminants and constituents consumed.

(B) All available human epidemiologic studies of the population that has consumed water impacted by the GRRP.

(C) The results of laboratory animal studies and health risk assessments available in peer-reviewed literature pertaining to water impacted by the GRRP and anticipated water quality changes resulting from the proposed increased TOC_{max}, including studies or assessments where extrapolation of data may be relevant.

(D) A health risk assessment of the potential individual and cumulative effects of the regulated contaminants described in section 62320.030 and the constituents monitored pursuant to subsections 60320.047(a) and (c), in a manner that includes;

(1) lifetime risks of cancer and

(2) risks of non-cancer effects.

(E) A report detailing comments, questions, concerns, and conclusions of a review by an independent scientific peer review advisory panel that includes, as a minimum, a toxicologist, an epidemiologist, an engineering geologist or hydrogeologist registered in California, an engineer licensed in California with at least three years of experience in wastewater treatment and public water supply, a microbiologist, and a chemist.

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

(1) immediately suspend the addition of recycled municipal wastewater 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.

(f) If the GRRP exceeds the limit in (c)(1)(B), (c)(2)(B), or its approved increased TOC_{max} limit obtained pursuant to subsection (d) 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.

(g) 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 (see Endnote 6):

(1) Be quantifiable in the wastewater, recycled municipal wastewater, 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) Each quarter, the GRRP shall sample and analyze the recycled municipal wastewater and the downgradient monitoring wells specified by the Department for the following (see Endnote 2):

(1) 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] specified by the Department, based on the Department's review of the GRRP's engineering report;

(2) 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

(3) Chemicals that the Department has specified (See Endnote 4), based on a review of the GRRP's engineering report, the affected groundwater basin(s), and the results of the assessment performed pursuant to subparagraph 60320(a)(2)(A).

(b) The GRRP may reduce monitoring for the constituents in (a) to once each year following Department approval based on the Department's review of the results of the monitoring in (a).

(c) Annually, the GRRP shall monitor the recycled municipal wastewater for constituents indicating the presence of municipal wastewater, as specified by the Department (See Endnote 5) based on the following:

(1) a review of the GRRP's engineering report,

(2) the contaminant list developed pursuant to section 60320(a)(2)(D),

(3) the affected groundwater basin(s),

(4) a constituent's ability to characterize the presence of pharmaceuticals, endocrine disrupting chemicals, personal care products, and other indicators of the presence of municipal wastewater, and

(5) the availability of a test method for a constituent.

(d) A constituent detected as a result of monitoring conducted pursuant to this section shall be reported to the Department and RWQCB no later than the quarter following the quarter in which the results are received by the GRRP.

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 the nitrogen compounds in section 60320.020, 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 a 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 where the GRRP's recharge water has been retained in the saturated zone for 1-3 months but will take at least three months before reaching the nearest domestic water supply well,

(2) At an additional point or points between the surface or subsurface application facility and the nearest downgradient domestic water supply well, and

(3) Such that samples can be obtained independently from each aquifer that will receive 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 municipal wastewater 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, the GRRP shall ensure the laboratory submits results 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 the date specified in the GRRP's RWQCB permit, the project sponsor shall provide a report to the RWQCB and the Department. Public water systems having downgradient sources potentially affected by the GRRP shall be notified by direct mail of the availability of the report. The report shall be prepared by an engineer licensed in California and experienced in the fields of wastewater treatment and public water supply. The report shall include the following:

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

(2) For any violations of this Chapter during the previous calendar year;

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

(B) a summary of any corrective actions and/or suspensions of surface or subsurface application of recycled municipal wastewater 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, as well as diluent water supplies,

(4) Information pertaining to the vertical and horizontal migration of the recharge water plume,

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

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

(7) The estimated quantity and quality of the recycled municipal wastewater and diluent water to be utilized for the next twelve months.

(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 requirement in subsection 60320.010(c) has 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[7]. Engineering Report

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

(b) The report shall be prepared by a properly qualified engineer ~~registered~~ licensed 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.

[7] Section 60320 is an existing section. The text reflects the proposed amendments.

Endnotes for Draft Groundwater Recharge Reuse Regulations

These Endnotes accompany the draft recharge regulations currently being developed by the California Department of Public Health's Drinking Water Program, *but are not expected to be part of the proposed regulatory package.* The draft recharge regulations address the supplementation of groundwater by surface or subsurface application of treated municipal wastewater prior to eventual extraction via drinking water wells for potable use.

The latest draft is here:

http://www.cdph.ca.gov/healthinfo/environhealth/water/Pages/Waterrecycling.aspx

ENDNOTE 1.

§60320.030. Control of Regulated Chemicals and Physical Characteristics

Examples of contaminants whose MCL compliance is not based on a running annual average include; nitrate, nitrite, and perchlorate.

ENDNOTE 2.

§60320.047. Additional Constituent Monitoring

Analytical Methods for Unregulated Chemicals

Subsection (a) states that the GRRP shall conduct the following and report any detections.

Some of the chemicals will have analytical methods that are available. Some may not.

CDPH views the use of drinking water methods as most appropriate, since they are generally more sensitive than wastewater methods. However, this may not always be possible, since there may be characteristics of the wastewater (e.g., high total dissolved solids) that may make the use of drinking water methods difficult.

GRRPs should select methods for non-regulated chemicals according to the following approach.

1. Use CDPH-approved drinking water methods, when available.

2. Use CDPH-recommended methods for chemicals if no CDPH-approved drinking water method is available (e.g., 1,2,3-TCP).

3. If there is no CDPH-recommended drinking water method for a chemical, and more than a single EPA-approved method is available, consult with CDPH to determine the appropriate EPA-approved method.

4. 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), consult with CDPH to determine an appropriate method.

5. 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 CDPH for review.

6. 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 CDPH-approved or -recommended or EPA-approved drinking water method is available.

7. If no method is available for a specific contaminant, as may be the case for certain endocrine disrupting chemicals, pharmaceuticals, personal care products, or other chemicals indicating the presence of wastewater (see Endnote 5), the GRRP should propose an alternative contaminant that might be used as an indicator or surrogate for the contaminant of interest, or an alternate sampling program that addresses the contaminant of concern, or the category of the contaminant of concern.

ENDNOTE 3.

§60320.047. Additional Constituent Monitoring

Selected chemicals with CDPH notification levels for possible analysis.

Paragraph (a)(2) refers to chemicals with state notification levels that CDPH has specified. These chemicals are selected from CDPH's chemicals with notification levels; chemicals already included in analysis required under other subsections are not included here.

These chemicals have either been detected at least once in drinking water supplies over the past few years, or if not detected, they are of interest for some specific reason [e.g., formaldehyde is of interest because in may be a byproduct

of certain treatment processes]. These would likely include boron, chlorate, 1,4-dioxane, formaldehyde, N-nitrosodimethylamine (NDMA), 1,2,3-trichloropropane, and vanadium.

ENDNOTE 4.

§60320.047. Additional Constituent Monitoring

Additional chemicals for analysis

Paragraph (a)(3) refers to other chemicals that CDPH has specified. These chemicals would likely include: chromium-6, diazinon, and nitrosamines for which US EPA has developed analytical methods.

ENDNOTE 5.

§60320.047. Additional Constituent Monitoring

Pharmaceuticals, endocrine disruptors, and other wastewater indicator chemicals

Subsection (c) refers to pharmaceuticals, endocrine disruptors and other indicators of the presence of municipal wastewater as specified by CDPH.

CDPH is interested in collecting information that relates to the presence of the listed categories of contaminants in municipal wastewater that may be found in recycled municipal wastewater.

The specific contaminants targeted for monitoring will likely vary among GRRPs, depending on their individual engineering reports and characteristics of their groundwater basins, as well as the GRRP's efforts that have been taken to address the presence of endocrine disrupting chemicals, pharmaceuticals, and personal care products in recycled municipal wastewater, and its efforts to assure that their presence in recycled municipal wastewater is at levels that are protective of the public health.

Monitoring for these chemicals—or categories of chemicals—is a diligent way of assessing and verifying recycled municipal wastewater quality characteristics, which can be useful in addressing issues of public perception about the safety of recharge projects.

Further, should there be positive findings of these types of chemicals, the recharge agency and CDPH 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.
Such monitoring is not for compliance purposes, but for informational use only.

If a GRRP has additional reports for its own project using prior data that address the types of chemicals discussed in this Endnote, or reports for its own project addressing the effectiveness of the treatment processes in limiting the release of endocrine disruptors, pharmaceuticals, or personal care chemicals into recharge water, those reports should be made available to CDPH to assist in developing an approach that would build upon or supplement the already available information.

A GRRP that has little monitoring information should plan on collecting more analytical data related to endocrine disrupting chemicals, pharmaceuticals, personal care products and other chemicals that are indicators of wastewater in its recharge water.

A GRRP that can demonstrate a history of 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 appropriate indicator or surrogate chemicals in its recharge water will likely be encouraged to continue its research efforts, and likely have no contaminants specified by CDPH for analysis under this section.

GRRPs will not be required to conduct an ongoing monitoring program for contaminants under this section, unless good indicator or surrogate chemicals can be identified through this monitoring, and analytical methods are available to perform that 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 or surrogate chemicals with available analytical methods can be identified, requirements for their monitoring will be considered. This notwithstanding, CDPH recommends an ongoing monitoring program to address public concerns about the presence in wastewater about these types of chemicals.

A monitoring program could include sampling and analysis for representatives of these categories of contaminants (including surrogates or specific chemicals indicators):

- Hormones. CDPH at this time does not recommend specific chemicals. However, GRRPs should investigate chemicals that could represent either female or male hormones, or surrogates that could represent both.

• "Industrial" endocrine disruptors: CDPH at this time does not recommend specific chemicals. However, GRRPs should investigate chemicals such as bisphenol A, nonylphenol and nonylphenol polyethoxylates, octylphenol and octylphenol polyethoxylates, and polybrominated diphenyl ethers, or surrogates that could represent one or more industrial endocrine disruptors.

• Pharmaceuticals: CDPH at this time does not recommend specific chemicals. However, GRRPs should investigate chemicals such as acetaminophen, amoxicillin, azithromycin, carbamazepine, ciprofloxacin, dilantin, gemfibrozil, ibuprofen, lipitor, meprobamate, sulfamethoxazole, trimethoprin, and salicylic acid, or surrogates that could represent one or more pharmaceuticals.

• Personal Care Products: CDPH at this time does not recommend specific chemicals. However, GRRPs should investigate chemicals such triclosan and DEET, or surrogates that could represent one or more personal care products.

• Other chemicals that may suggest the presence of wastewater: CDPH at this time does not recommend specific chemicals. However, GRRPs should investigate chemicals such as caffeine, iodinated contrast media, fire retardants such as TCEP, or surrogates that could represent one or more chemicals that suggest the presence of wastewater.

There are no drinking water standards for the contaminants listed above and no standards are anticipated. In addition, analytical methods may not be widely available (See Endnote 2).

ENDNOTE 6.

Alternatives to Using TOC

The current draft proposes that GRRPs interested in using an alternative wastewater constituent or constituents in lieu of TOC must demonstrate that the alternative proposed is quantifiable in the wastewater, recycled municipal wastewater, groundwater, and throughout the treatment processes. Further, the alternative must have identifiable treatment performance standards and an overall demonstration that it provides the same level of public health protection as the TOC requirement.

A GRRP that can demonstrate a history of sampling, analysis, and related research to support the use of alternatives should provide this information to CDPH when proposing an alternative.

One alternative that has been suggested to CDPH for consideration is the use of Biodegradable Dissolved Organic Carbon (BDOC) in concert with specific chemical indicators to assure proper removal of unregulated wastewater-derived organics for surface application projects. In this case, indicators are defined as individual compounds occurring at quantifiable levels that can represent certain physical, chemical and biological characteristics that are relevant to fate and transport during treatment (where treatment includes wastewater and soil aquifer treatment (SAT)). BDOC is a measure of dissolved biodegradable organic matter that is consumed or otherwise altered by indigenous bacterial populations. The use of BDOC by measuring differential (delta) TOC (i.e., the differences between recycled municipal wastewater TOC and before and after transport through the soil column) and specific chemical indicators may be able to serve as a surrogate for the absence of biodegradable organic compounds that are not derived from humic (i.e., soil) substances.

The use of BDOC/indicators would likely consist of a number of elements, including the following:

1. For each project, prior to start-up,

    A. The GRRP will select a set of indicator compounds for approval by CDPH that can be reliably measured by approved laboratory methods in recycled municipal wastewater and groundwater that also reflect good and poor removal via SAT. For purposes of this section, "good" is >90 percent, and "poor" is <25 percent removal.

    B. The GRRP will identify the laboratory or laboratories that will be used for BDOC analyses and the federal or state approved or recommended methods that will be used for those analyses. If no approved or recommended method is available for determining BDOC, the GRRP's laboratory may develop or use its own methods and should provide the analytical methods to CDPH for review. Those methods may be used until federal or state approved or recommended methods are available. Where multiple analytical methods exist, the more sensitive method should be used (i.e., that which can measure indicator compounds at a lower concentration).

    C. The GRRP will validate the presence of the proposed indicators in the recycled municipal wastewater, and would also collect baseline data from the project's monitoring wells. The selected indicators and baseline data will be presented in the GRRP's Engineering Report.

    D. The GRRP will establish baseline information on BDOC and TOC in recycled municipal wastewater and groundwater monitoring wells.

The GRRP will also characterize expected SAT performance by conducting batch soil column tests with recycled municipal wastewater and measuring BDOC and delta TOC. This information will be provided in the GRRP's Engineering Report.

2. During start-up, the GRRP, through frequent monitoring and analysis, will validate the expected BDOC performance, delta TOC, and indicator removal performance. If BDOC performs as expected, the delta TOC can serve as the routine parameter that is monitored to validate that the expected biodegradation is occurring, along with the selected indicators, provided that the GRRP also monitors TOC consistent with the regulations for a specific time period established by CDPH and designated in its permit.

3. During routine operation, the GRRP would use delta TOC and the indicators to validate performance of the project. In parallel, the GRRP will also monitor TOC consistent with the regulations for a specific time period established by CDPH, and designated in its permit. This will enable the GRRP to demonstrate the suitability of its alternative approach.

4. The RWC will initially be set at 20%, or some other value, as determined in its permit. The GRRP may be allowed to increase the RWC up to 50% in a phased manner over time (such as five years) as long as BDOC and indicator performance are the same as the performance observed at the 20% or initial RWC. At each increased step, the GRRP will also monitor TOC consistent with the regulations for a specific time period established by CDPH, and designated in its permit.

5. If the BDOC in any monitoring well associated with the GRRP or the indicators begin to perform differently than as observed during startup or previous monitoring events, then a GRRP would have to evaluate its project for the cause and adjust the RWC downward. The GRRP will also monitor TOC consistent with the regulations.

6. As part of the proposal to CDPH, the GRRP will convene an expert panel to provide feedback to CDPH on the proposed approach and, if the proposal is accepted, to meet periodically to provide feedback on its performance and adequacy of BDOC monitoring.

7. Indicator compounds selected will be re-evaluated by the expert panel and by CDPH for continued relevance by the GRRP annually.

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

	Method 1	Method 2	Method 3
Compliance point and monitoring	• Anywhere representative of recycled municipal wastewater or recharge water (i.e. including in or above the mound) • Samples analyzed for total nitrogen • Reduced monitoring available	• Anywhere representative of recycled municipal wastewater or recharge water. (i.e. prior to surface or subsurface application 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 • A groundwater sample analyzed for DO • Reduced monitoring available	• Only for projects in operation for ≥ 20 years • Groundwater downgradient of the recharge area • Samples analyzed for nitrate and nitrite
Standard(s)	• 5 mg/L total N as an average	• 10 mg/L total nitrogen and • Limits established in the engineering report for other constituents	MCLs for nitrate and nitrite
Frequency of sampling	2 per week	As established by CDPH and specified in the operations plan	• Specified in the engineering report and operations plan. • Relatively frequent monitoring at locations between the recharge area and downgradient domestic wells is required.
Consequence of failure	• Investigate, correct, and notify if the average of two consecutive samples >5 mg/L • Suspend application of recycled municipal wastewater if the 4-week average of all samples >5 mg/L	• Investigate, correct, and notify if the average of two consecutive samples >10 mg/L total nitrogen standard or exceeds standard for other constituents • Suspend surface and subsurface application of recycled municipal wastewater until the average of two consecutive samples meets all limits	• Notify the Department and RWQCB if > MCLs • Suspend surface and subsurface application 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 municipal wastewater that the chance that the NO_2 or NO_3 MCL could be exceeded is minute.	Method 2 relies on: 1. A low enough limit for the total N in the recycled municipal wastewater that the chance that a NO_2 or NO_3 MCL could be exceeded is low, combined with 2. A set of limits determined for a specific GRRP and explained in the Engineering Report for nitrite, organic nitrogen and /or ammonia necessary to limit oxidation to NO_2 or NO_3, and a set of minimum levels for an excess DO over BOD requirement in the recycled municipal wastewater and/or a DO requirement in the groundwater as necessary to prevent reduction of NO_3 to NO_2	Method 3 relies on: 1. A demonstration that historic recharge with water containing comparable levels of nitrogen has not caused a problem, 2. Evidence that recharge water can be tracked and monitored throughout the flow path, and 3. Monitoring to show that the MCLs for NO_2 and NO_3 are met in the groundwater.

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