64669.45 Pathogen Control

Municipal wastewater used in a DPR project shall receive continuous treatment pursuant to this section prior to entering a water distribution system of a public water system.

(a)

The DPR project treatment train shall be designed and constructed to comply with the following: (1) The sum of the treatment process validated pathogen log reductions for the treatment train shall be at least 20 log for enteric virus, 14 log for Giardia lamblia cyst, and 15 log for Cryptosporidium oocyst. (2) The treatment train shall consist of no less than four separate treatment processes for each of the following pathogens: enteric virus, Giardia lamblia cyst, and Cryptosporidium oocyst. Four treatment processes for each pathogen shall each be credited with no less than 1.0 log reduction, and no single process may be credited with more than 6 log reduction. A single treatment process may receive pathogen log reduction credits for one or more pathogens. (3) The treatment train shall consist of no less than three diverse treatment mechanisms each for enteric virus, Giardia lamblia cyst, and Cryptosporidium oocyst. The three treatment mechanisms shall include one membrane physical separation mechanism, one chemical inactivation mechanism, and one UV inactivation mechanism, with each treatment mechanism validated for no less than 1.0 log reduction for each of the three pathogens, enteric virus, Giardia lamblia cyst, and Cryptosporidium oocyst. Additional

treatment mechanisms may be used.(A) An alternative mechanism to a treatment mechanism identified in subsection (3) may be approved as long as the three treatment train mechanisms include physical separation and inactivation. Use of the alternative shall assure an equivalent or better level of protection of public health with respect to treatment technique diversity and treatment train robustness. (B) The proposed alternative shall be reviewed by an independent advisory panel pursuant to section 64669.120. (4) Each treatment process used to meet the requirements in this subsection shall have the pathogen log reduction validated. The DiPRRA may use: (A) A validation study report previously approved by the State Board conducted using an approved protocol with elements described in subsection (a)(5)(C), (B) A pathogen log inactivation table pursuant to Chapter 17, or (C) A validation study pursuant to subsection (a)(5). (5) A validation study is subject to the following requirements.(A) Prior to conducting a validation study, the DiPRRA shall submit a validation study protocol to the State Board. (B) The validation study protocol shall be prepared by an engineer licensed in California with at least five years of experience, as a licensed engineer, in drinking water or wastewater treatment evaluating treatment processes for pathogen control in a public water supply. The validation study protocol may rely on validation study protocol(s) previously approved by the State Board for use in validating water treatment technologies for pathogen control. Validation of granular media filters may be conducted using a pilot plant with verification based on turbidity and periodic particle count monitoring. (C) The validation study protocol shall:1. Identify the treatment mechanism(s) of pathogen reduction by the treatment process. 2. Identify the pathogen(s) being addressed by the treatment, or appropriate surrogate(s) for the pathogen(s), that are used in the validation study. The pathogen(s) and surrogate(s) selected for the validation

study shall be one(s) most resistant to the treatment mechanism(s). 3. Ensure that the pathogen(s) or surrogate(s) for the pathogen(s) are present in the test water in concentrations sufficient to demonstrate a pathogen log reduction. 4. Identify the factors that influence the pathogen reduction efficiency for the treatment mechanism(s). Influencing factors include feed water characteristics such as temperature and pH, hydraulic loading, deterioration of components, and integrity failure. 5. Identify the surrogate and/or operational parameters that can be measured continuously and that will correlate with the reduction of the pathogen(s) or surrogate(s) for the pathogen(s). 6. Identify the validation methodology to demonstrate the pathogen log removal capability of the treatment process. The validation methodology shall involve a challenge test to quantify the reduction of the target pathogen or appropriate surrogate while concurrently monitoring the operational parameters to determine an operating envelope. 7. Describe the method to collect and analyze data to formulate evidence-based conclusions. 8. Describe the method to determine the critical limit(s) and the operational monitoring and control strategy. 9. Describe the method to be used to calculate the LRV for the treatment process for each pathogen. The validated LRV shall not exceed that achieved by 95 percent of the challenge test results when the treatment process is operating in compliance with the critical limit(s). 10. Identify the circumstances that would require a re-validation or additional on-site validation (for example, when conditions are inconsistent with the previous validation study conditions). (D) A validation study report documenting the validation study methodology and results shall be submitted to the State Board as part of the submittal of the engineering report prepared pursuant to section 64669.75. The validation study report shall be prepared by an engineer licensed in California with at least five years of

experience, as a licensed engineer, in drinking water or wastewater treatment evaluating treatment processes for pathogen control in a public water supply. The validation study report shall identify the LRV demonstrated by each treatment process for each pathogen pursuant to subsection (a)(5)(C)(9.), the operating envelope, and the critical limit(s) for each validated treatment process. When a previous validation study pursuant to subsection (a)(4)(A) is used, the test protocol and report of the previous validation study shall be included in the engineering report prepared pursuant to section 64669.75 and shall be reviewed by the engineer preparing the engineering report. (6) The treatment train LRV for enteric virus, Giardia lamblia cyst, and Cryptosporidium oocyst is the sum of the treatment process LRVs for each pathogen. (7) The treatment train shall include UV disinfection with a dose of at least 300 mJ per cm2.

(1)

The sum of the treatment process validated pathogen log reductions for the treatment train shall be at least 20 log for enteric virus, 14 log for Giardia lamblia cyst, and 15 log for Cryptosporidium oocyst.

(2)

The treatment train shall consist of no less than four separate treatment processes for each of the following pathogens: enteric virus, Giardia lamblia cyst, and Cryptosporidium oocyst. Four treatment processes for each pathogen shall each be credited with no less than 1.0 log reduction, and no single process may be credited with more than 6 log reduction. A single treatment process may receive pathogen log reduction credits for one or more pathogens.

(3)

The treatment train shall consist of no less than three diverse treatment mechanisms each for enteric virus, Giardia lamblia cyst, and Cryptosporidium oocyst. The three

treatment mechanisms shall include one membrane physical separation mechanism, one chemical inactivation mechanism, and one UV inactivation mechanism, with each treatment mechanism validated for no less than 1.0 log reduction for each of the three pathogens, enteric virus, Giardia lamblia cyst, and Cryptosporidium oocyst. Additional treatment mechanisms may be used.(A) An alternative mechanism to a treatment mechanism identified in subsection (3) may be approved as long as the three treatment train mechanisms include physical separation and inactivation. Use of the alternative shall assure an equivalent or better level of protection of public health with respect to treatment technique diversity and treatment train robustness. (B) The proposed alternative shall be reviewed by an independent advisory panel pursuant to section 64669.120.

(A)

An alternative mechanism to a treatment mechanism identified in subsection (3) may be approved as long as the three treatment train mechanisms include physical separation and inactivation. Use of the alternative shall assure an equivalent or better level of protection of public health with respect to treatment technique diversity and treatment train robustness.

(B)

The proposed alternative shall be reviewed by an independent advisory panel pursuant to section 64669.120.

(4)

Each treatment process used to meet the requirements in this subsection shall have the pathogen log reduction validated. The DiPRRA may use: (A) A validation study report previously approved by the State Board conducted using an approved protocol with elements described in subsection (a)(5)(C), (B) A pathogen log inactivation table pursuant to Chapter 17, or (C) A validation study pursuant to subsection (a)(5).

(A)

A validation study report previously approved by the State Board conducted using an approved protocol with elements described in subsection (a)(5)(C),

(B)

A pathogen log inactivation table pursuant to Chapter 17, or

(C)

A validation study pursuant to subsection (a)(5).

(5)

A validation study is subject to the following requirements.(A) Prior to conducting a validation study, the DiPRRA shall submit a validation study protocol to the State Board. (B) The validation study protocol shall be prepared by an engineer licensed in California with at least five years of experience, as a licensed engineer, in drinking water or wastewater treatment evaluating treatment processes for pathogen control in a public water supply. The validation study protocol may rely on validation study protocol(s) previously approved by the State Board for use in validating water treatment technologies for pathogen control. Validation of granular media filters may be conducted using a pilot plant with verification based on turbidity and periodic particle count monitoring. (C) The validation study protocol shall:1. Identify the treatment mechanism(s) of pathogen reduction by the treatment process. 2. Identify the pathogen(s) being addressed by the treatment, or appropriate surrogate(s) for the pathogen(s), that are used in the validation study. The pathogen(s) and surrogate(s) selected for the validation study shall be one(s) most resistant to the treatment mechanism(s). 3. Ensure that the pathogen(s) or surrogate(s) for the pathogen(s) are present in the test water in concentrations sufficient to demonstrate a pathogen log reduction. 4. Identify the factors that influence the pathogen reduction efficiency for the treatment mechanism(s). Influencing factors include feed water characteristics such as temperature and pH, hydraulic loading, deterioration of components, and

integrity failure. 5. Identify the surrogate and/or operational parameters that can be measured continuously and that will correlate with the reduction of the pathogen(s) or surrogate(s) for the pathogen(s). 6. Identify the validation methodology to demonstrate the pathogen log removal capability of the treatment process. The validation methodology shall involve a challenge test to quantify the reduction of the target pathogen or appropriate surrogate while concurrently monitoring the operational parameters to determine an operating envelope. 7. Describe the method to collect and analyze data to formulate evidence-based conclusions. 8. Describe the method to determine the critical limit(s) and the operational monitoring and control strategy. 9. Describe the method to be used to calculate the LRV for the treatment process for each pathogen. The validated LRV shall not exceed that achieved by 95 percent of the challenge test results when the treatment process is operating in compliance with the critical limit(s). 10. Identify the circumstances that would require a re-validation or additional on-site validation (for example, when conditions are inconsistent with the previous validation study conditions). (D) A validation study report documenting the validation study methodology and results shall be submitted to the State Board as part of the submittal of the engineering report prepared pursuant to section 64669.75. The validation study report shall be prepared by an engineer licensed in California with at least five years of experience, as a licensed engineer, in drinking water or wastewater treatment evaluating treatment processes for pathogen control in a public water supply. The validation study report shall identify the LRV demonstrated by each treatment process for each pathogen pursuant to subsection (a)(5)(C)(9.), the operating envelope, and the critical limit(s) for each validated treatment process. When a previous validation study pursuant to subsection (a)(4)(A) is used, the test protocol and report of the previous validation study shall be included in the engineering report prepared pursuant to section 64669.75 and shall be reviewed by the engineer

preparing the engineering report.

(A)

Prior to conducting a validation study, the DiPRRA shall submit a validation study protocol to the State Board.

(B)

The validation study protocol shall be prepared by an engineer licensed in California with at least five years of experience, as a licensed engineer, in drinking water or wastewater treatment evaluating treatment processes for pathogen control in a public water supply. The validation study protocol may rely on validation study protocol(s) previously approved by the State Board for use in validating water treatment technologies for pathogen control. Validation of granular media filters may be conducted using a pilot plant with verification based on turbidity and periodic particle count monitoring.

(C)

The validation study protocol shall:1. Identify the treatment mechanism(s) of pathogen reduction by the treatment process. 2. Identify the pathogen(s) being addressed by the treatment, or appropriate surrogate(s) for the pathogen(s), that are used in the validation study. The pathogen(s) and surrogate(s) selected for the validation study shall be one(s) most resistant to the treatment mechanism(s). 3. Ensure that the pathogen(s) or surrogate(s) for the pathogen(s) are present in the test water in concentrations sufficient to demonstrate a pathogen log reduction. 4. Identify the factors that influence the pathogen reduction efficiency for the treatment mechanism(s). Influencing factors include feed water characteristics such as temperature and pH, hydraulic loading, deterioration of components, and integrity failure. 5. Identify the surrogate and/or operational parameters that can be measured continuously and that will correlate with the reduction of the pathogen(s) or surrogate(s) for the pathogen(s). 6. Identify the validation methodology to demonstrate the pathogen log removal capability of the treatment process. The validation methodology shall

involve a challenge test to quantify the reduction of the target pathogen or appropriate surrogate while concurrently monitoring the operational parameters to determine an operating envelope. 7. Describe the method to collect and analyze data to formulate evidence-based conclusions. 8. Describe the method to determine the critical limit(s) and the operational monitoring and control strategy. 9. Describe the method to be used to calculate the LRV for the treatment process for each pathogen. The validated LRV shall not exceed that achieved by 95 percent of the challenge test results when the treatment process is operating in compliance with the critical limit(s). 10. Identify the circumstances that would require a re-validation or additional on-site validation (for example, when conditions are inconsistent with the previous validation study conditions).

1.

Identify the treatment mechanism(s) of pathogen reduction by the treatment process.

2.

Identify the pathogen(s) being addressed by the treatment, or appropriate surrogate(s) for the pathogen(s), that are used in the validation study. The pathogen(s) and surrogate(s) selected for the validation study shall be one(s) most resistant to the treatment mechanism(s).

3.

Ensure that the pathogen(s) or surrogate(s) for the pathogen(s) are present in the test water in concentrations sufficient to demonstrate a pathogen log reduction.

4.

Identify the factors that influence the pathogen reduction efficiency for the treatment mechanism(s). Influencing factors include feed water characteristics such as temperature and pH, hydraulic loading, deterioration of components, and integrity failure.

5.

Identify the surrogate and/or operational parameters that can be measured continuously and that will correlate with the reduction of the pathogen(s) or surrogate(s) for the pathogen(s).

6.

Identify the validation methodology to demonstrate the pathogen log removal capability of the treatment process. The validation methodology shall involve a challenge test to quantify the reduction of the target pathogen or appropriate surrogate while concurrently monitoring the operational parameters to determine an operating envelope.

7.

Describe the method to collect and analyze data to formulate evidence-based conclusions.

8.

Describe the method to determine the critical limit(s) and the operational monitoring and control strategy.

9.

Describe the method to be used to calculate the LRV for the treatment process for each pathogen. The validated LRV shall not exceed that achieved by 95 percent of the challenge test results when the treatment process is operating in compliance with the critical limit(s).

10.

Identify the circumstances that would require a re-validation or additional on-site validation (for example, when conditions are inconsistent with the previous validation study conditions).

(D)

A validation study report documenting the validation study methodology and results shall be submitted to the State Board as part of the submittal of the engineering report prepared pursuant to section 64669.75. The validation study report shall be prepared by an engineer licensed in California with at least five years of experience, as a licensed engineer, in drinking water or wastewater treatment evaluating treatment processes for pathogen control in a public water supply. The validation study report shall identify the LRV demonstrated by each treatment process for each pathogen pursuant to subsection (a)(5)(C)(9.), the operating envelope, and the critical limit(s) for each validated treatment process. When a previous

validation study pursuant to subsection (a)(4)(A) is used, the test protocol and report of the previous validation study shall be included in the engineering report prepared pursuant to section 64669.75 and shall be reviewed by the engineer preparing the engineering report.

(6)

The treatment train LRV for enteric virus, Giardia lamblia cyst, and Cryptosporidium oocyst is the sum of the treatment process LRVs for each pathogen.

(7)

The treatment train shall include UV disinfection with a dose of at least 300 mJ per cm2.

(b)

The DPR project treatment train shall be operated to comply with the following:(1) To determine compliance with the pathogen log reductions pursuant to this subsection, treatment train LRVs shall be tracked continuously with a SCADA system utilizing online monitoring of surrogates and/or operational parameters for each treatment process that was credited for pathogen reduction based on the validation study report prepared pursuant to subsection (a)(5). (2) The treatment train shall be continuously operated to achieve 16 log reduction of enteric virus, 10 log reduction of Giardia lamblia cyst, and 11 log reduction of Cryptosporidium oocyst using validated treatment LRVs and available options in subsection (d) at all times while conforming to the operations plan prepared pursuant to section 64669.80. (3) The treatment train shall be operated to achieve 20 log reduction of enteric virus, 14 log reduction of Giardia lamblia cyst, and 15 log reduction of Cryptosporidium oocyst no less than 90 percent of the time the treatment train produces water in a calendar month while conforming to the operations plan prepared pursuant to section 64669.80. (4) If the treatment train achieves 20 log reduction for enteric virus, 14 log reduction for Giardia lamblia cyst, or 15 log

reduction for Cryptosporidium oocyst less than 90 percent of the time the treatment train produced water in a calendar month for two consecutive months, a DiPRRA shall:(A) Evaluate the cause(s) of the failure to achieve the 20 log reduction for enteric virus, 14 log reduction for Giardia lamblia cyst, or 15 log reduction for Cryptosporidium oocyst; (B) Take corrective action; and (C) Summarize the evaluation and corrective actions taken in the monthly compliance report submitted pursuant to section 64669.95. (5) The DiPRRA shall take action to immediately discontinue delivery of DPR project water to any distribution system if 16 log reduction for enteric virus, 10 log reduction for Giardia lamblia cyst, or 11 log reduction for Cryptosporidium oocyst are not met, with compliance determined based on subsection (b)(1). (6) The DiPRRA shall take immediate action pursuant to the operations plan to restore functionality of a treatment process if the minimum number of treatment processes identified in subsection (a)(2) for any pathogen listed in subsection (a)(1) are not functional. The DiPRRA shall notify the State Board within 24 hours of determination that the number of pathogen treatment processes used in an operating treatment train is fewer than four. (7) The DiPRRA shall take immediate action pursuant to the operations plan to restore functionality of a treatment mechanism if a treatment mechanism identified in subsection (a)(3) for any pathogen listed in subsection (a)(1) is not functional. The DiPRRA shall notify the State Board within 24 hours of determination that the number of treatment mechanisms used in an operating treatment train is fewer than three or does not include those specified in subsection (a)(3). (8) The DiPRRA shall notify the State Board and each public water system receiving finished water directly from the DPR project within 60 minutes of knowledge of a failure that necessitates discontinuing delivery of DPR project water to any distribution system pursuant to subsection (b)(5). (9) The

DiPRRA shall notify the State Board before commencing delivery of finished water to a distribution system after an incident pursuant to subsection (b)(5) occurs and restart the DPR plant in accordance with a protocol in an approved operations plan prepared pursuant to section 64669.80. The DiPRRA shall submit an incident report, including corrective actions taken, to the State Board with the monthly compliance report submitted pursuant to section 64669.95.

(1)

To determine compliance with the pathogen log reductions pursuant to this subsection, treatment train LRVs shall be tracked continuously with a SCADA system utilizing online monitoring of surrogates and/or operational parameters for each treatment process that was credited for pathogen reduction based on the validation study report prepared pursuant to subsection (a)(5).

(2)

The treatment train shall be continuously operated to achieve 16 log reduction of enteric virus, 10 log reduction of Giardia lamblia cyst, and 11 log reduction of Cryptosporidium oocyst using validated treatment LRVs and available options in subsection (d) at all times while conforming to the operations plan prepared pursuant to section 64669.80.

(3)

The treatment train shall be operated to achieve 20 log reduction of enteric virus, 14 log reduction of Giardia lamblia cyst, and 15 log reduction of Cryptosporidium oocyst no less than 90 percent of the time the treatment train produces water in a calendar month while conforming to the operations plan prepared pursuant to section 64669.80.

(4)

If the treatment train achieves 20 log reduction for enteric virus, 14 log reduction for Giardia lamblia cyst, or 15 log reduction for Cryptosporidium oocyst less than 90

percent of the time the treatment train produced water in a calendar month for two consecutive months, a DiPRRA shall:(A) Evaluate the cause(s) of the failure to achieve the 20 log reduction for enteric virus, 14 log reduction for Giardia lamblia cyst, or 15 log reduction for Cryptosporidium oocyst; (B) Take corrective action; and (C) Summarize the evaluation and corrective actions taken in the monthly compliance report submitted pursuant to section 64669.95.

(A)

Evaluate the cause(s) of the failure to achieve the 20 log reduction for enteric virus, 14 log reduction for Giardia lamblia cyst, or 15 log reduction for Cryptosporidium oocyst;

(B)

Take corrective action; and

(C)

Summarize the evaluation and corrective actions taken in the monthly compliance report submitted pursuant to section 64669.95.

(5)

The DiPRRA shall take action to immediately discontinue delivery of DPR project water to any distribution system if 16 log reduction for enteric virus, 10 log reduction for Giardia lamblia cyst, or 11 log reduction for Cryptosporidium oocyst are not met, with compliance determined based on subsection (b)(1).

(6)

The DiPRRA shall take immediate action pursuant to the operations plan to restore functionality of a treatment process if the minimum number of treatment processes identified in subsection (a)(2) for any pathogen listed in subsection (a)(1) are not functional. The DiPRRA shall notify the State Board within 24 hours of determination that the number of pathogen treatment processes used in an operating treatment train is fewer than four.

(7)

The DiPRRA shall take immediate action pursuant to the operations plan to restore functionality of a treatment mechanism if a treatment mechanism identified in subsection (a)(3) for any pathogen listed in subsection (a)(1) is not functional. The DiPRRA shall notify the State Board within 24 hours of determination that the number of treatment mechanisms used in an operating treatment train is fewer than three or does not include those specified in subsection (a)(3).

(8)

The DiPRRA shall notify the State Board and each public water system receiving finished water directly from the DPR project within 60 minutes of knowledge of a failure that necessitates discontinuing delivery of DPR project water to any distribution system pursuant to subsection (b)(5).

(9)

The DiPRRA shall notify the State Board before commencing delivery of finished water to a distribution system after an incident pursuant to subsection (b)(5) occurs and restart the DPR plant in accordance with a protocol in an approved operations plan prepared pursuant to section 64669.80. The DiPRRA shall submit an incident report, including corrective actions taken, to the State Board with the monthly compliance report submitted pursuant to section 64669.95.

(c)

The SCADA system shall identify a failure of a process to meet its critical limit(s) and shall automatically discontinue delivery of DPR project water to any distribution system if the treatment train does not meet the 16 log reduction for enteric virus, 10 log reduction for Giardia lamblia cyst, or 11 log reduction for Cryptosporidium oocyst. The SCADA system shall discontinue delivery of DPR project water to any distribution system within the time provided by the flow path

determined in section 64669.85(b)(3). The SCADA system shall have associated alarms that indicate when a process is not operating as designed.

(d)

A DiPRRA may propose to use subsections (d)(1), (d)(2), and (d)(3) to receive credit for a portion of the pathogen log reduction criteria in subsections (a)(1), (b)(2), and (b)(3). In no case shall a combination of options in subsections (d)(1), (d)(2) or (d)(3) be credited with more than two logs of the pathogen log reduction criteria in subsections (a)(1), (b)(2), and (b)(3). The proposal shall be included in the engineering report prepared pursuant to section 64669.75.(1) Continuous blending of DPR project water with an extracted ground water source or a surface water source of drinking water that has received permit approval from the State Board in accordance with sections 116525 through 116550 of the Health and Safety Code, or a finished water that has received permit approval from the State Board in accordance with sections 116525 through 116550 of the Health and Safety Code, such that the blended water is demonstrated to be completely blended and credit for the blended water is no more than the result of the calculation: the negative log of the WWC. Continuous blending may be credited with no more than two logs of the pathogen log reduction criteria in subsections (a)(1), (b)(2), and (b)(3). (2) Continuous mixing of DPR project water in a reservoir such that the elevated pathogen density in a one-hour discharge of inadequately treated water is attenuated by a factor commensurate with the credit in the water withdrawn from the reservoir as demonstrated with hydrodynamic modeling and tracer testing that is reviewed by an independent advisory panel pursuant to section 64669.120. The treatment train upstream of mixing pursuant to this subsection shall be designed and constructed to provide at least 16 log for enteric virus, 10 log for Giardia lamblia cyst, and 11 log for Cryptosporidium oocyst.

Continuous mixing may be credited with no more than two logs of the pathogen log reduction criteria in subsections (a)(1) and (b)(3). The credit pursuant to this subsection may only be used to meet the requirements of subsection (b)(2) for up to 60 minutes in any 24-hour period. (3) Recharge or storage of DPR project water into a groundwater basin such that the virus credit is no more than the result of the calculation: 0.033 log per day times the retention time (days) of DPR project water in groundwater basin. The retention time must be demonstrated with groundwater modeling and tracer testing that is reviewed by an independent advisory panel pursuant to section 64669.120. Groundwater recharge or storage may be credited with no more than two logs of the pathogen log reduction criteria in subsections (a)(1), (b)(2), and (b)(3).

(1)

Continuous blending of DPR project water with an extracted ground water source or a surface water source of drinking water that has received permit approval from the State Board in accordance with sections 116525 through 116550 of the Health and Safety Code, or a finished water that has received permit approval from the State Board in accordance with sections 116525 through 116550 of the Health and Safety Code, such that the blended water is demonstrated to be completely blended and credit for the blended water is no more than the result of the calculation: the negative log of the WWC. Continuous blending may be credited with no more than two logs of the pathogen log reduction criteria in subsections (a)(1), (b)(2), and (b)(3).

(2)

Continuous mixing of DPR project water in a reservoir such that the elevated pathogen density in a one-hour discharge of inadequately treated water is attenuated by a factor commensurate with the credit in the water withdrawn from the reservoir as demonstrated with hydrodynamic modeling and tracer testing that is reviewed by an

independent advisory panel pursuant to section 64669.120. The treatment train upstream of mixing pursuant to this subsection shall be designed and constructed to provide at least 16 log for enteric virus, 10 log for Giardia lamblia cyst, and 11 log for Cryptosporidium oocyst. Continuous mixing may be credited with no more than two logs of the pathogen log reduction criteria in subsections (a)(1) and (b)(3). The credit pursuant to this subsection may only be used to meet the requirements of subsection (b)(2) for up to 60 minutes in any 24-hour period.

(3)

Recharge or storage of DPR project water into a groundwater basin such that the virus credit is no more than the result of the calculation: 0.033 log per day times the retention time (days) of DPR project water in groundwater basin. The retention time must be demonstrated with groundwater modeling and tracer testing that is reviewed by an independent advisory panel pursuant to section 64669.120. Groundwater recharge or storage may be credited with no more than two logs of the pathogen log reduction criteria in subsections (a)(1), (b)(2), and (b)(3).

(e)

A proposal pursuant to subsection (d) shall:(1) identify the pathogen control point(s) and the operational parameter(s) and establish critical limit(s) that indicate whether the operation demonstrates the credit; and (2) identify the circumstances that would require a re-evaluation of an approved credit, such as when conditions are inconsistent with the previous demonstration test conditions.

(1)

identify the pathogen control point(s) and the operational parameter(s) and establish critical limit(s) that indicate whether the operation demonstrates the credit; and

(2)

identify the circumstances that would require a re-evaluation of an approved credit,

such as when conditions are inconsistent with the previous demonstration test conditions.

(f)

The DiPRRA may propose an alternative to the two log limitation and the virus reduction rate pursuant to subsection (d)(3). The proposal shall: (1) demonstrate that the proposed alternative credit provides pathogen control at least as health protective as a treatment process validated to the same log reduction pursuant to subsection (a)(5)(C); and (2) be reviewed by an independent advisory panel pursuant to section 64669.120(b);

(1)

demonstrate that the proposed alternative credit provides pathogen control at least as health protective as a treatment process validated to the same log reduction pursuant to subsection (a)(5)(C); and

(2)

be reviewed by an independent advisory panel pursuant to section 64669.120(b);

(g)

Water delivered to a water distribution system of a public water system shall meet the disinfection performance standards pursuant to section 64654(b).