60320.201 Advanced Treatment Criteria

Full advanced treatment is the treatment of an oxidized wastewater, as defined in section 60301.650 , using a reverse osmosis and an oxidation treatment process that, at a minimum, meets the criteria of this section.

(a)

A project sponsor shall select for use a reverse osmosis membrane such that: (1) each membrane element used in the project has achieved a minimum rejection of sodium chloride of no less than 99.0 percent (99.0%) and an average (nominal) rejection of sodium chloride of no less than 99.2 percent (99.2%), as demonstrated through Method A of ASTM International's method D4194-03 (2008) using the following substitute test conditions:(A) tests are operated at a recovery of no less than 15 percent (15%); (B) sodium chloride rejection is based on three or more successive measurements, after flushing and following at least 30 minutes of operation having demonstrated that rejection has stabilized; (C) an influent pH no less than 6.5 and no greater than 8.0; and (D) an influent sodium chloride concentration of no greater than 2,000 mg/L, to be verified prior to the start of testing; and (2) during the first twenty weeks of full-scale operation the membrane produces a permeate with no more than five percent (5%) of the sample results having TOC concentrations greater than 0.25 mg/L, as verified through monitoring no less frequent than weekly.

(1)

each membrane element used in the project has achieved a minimum rejection of sodium chloride of no less than 99.0 percent (99.0%) and an average (nominal) rejection of sodium chloride of no less than 99.2 percent (99.2%), as demonstrated through Method A of ASTM International's method D4194-03 (2008) using the following substitute test conditions:(A) tests are operated at a recovery of no less than 15 percent (15%); (B) sodium chloride rejection is based on three or more successive measurements, after flushing and following at least 30 minutes of operation having demonstrated that rejection has stabilized; (C) an influent pH no less than 6.5 and no greater than 8.0; and (D) an influent sodium chloride concentration of no greater than 2,000 mg/L, to be verified prior to the start of testing; and

(A)

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(B)

sodium chloride rejection is based on three or more successive measurements, after flushing and following at least 30 minutes of operation having demonstrated that rejection has stabilized;

(C)

an influent pH no less than 6.5 and no greater than 8.0; and

(D)

an influent sodium chloride concentration of no greater than 2,000 mg/L, to be verified prior to the start of testing; and

(2)

during the first twenty weeks of full-scale operation the membrane produces a permeate with no more than five percent (5%) of the sample results having TOC concentrations greater than 0.25 mg/L, as verified through monitoring no less frequent than weekly.

(b)

For the reverse osmosis treatment process, a project sponsor shall propose, for Department review and approval, on-going performance monitoring (e.g., conductivity or TOC) that indicates when the integrity of the process has been compromised. The proposal shall include at least one form of continuous monitoring, as well as the associated surrogate and/or operational parameter limits and alarm settings that indicate when the integrity has been compromised.

(c)

To demonstrate a sufficient oxidation process has been designed for implementation, a project sponsor shall:(1) Perform an occurrence study on the project's municipal wastewater to identify indicator compounds and select a total of at least nine indicator compounds, with at least one from each of the functional groups in subparagraphs (A) through (I) below. A project sponsor shall submit an occurrence study protocol, as well as the subsequent results and chosen indicator compounds, to the Department for review and approval. (A) Hydroxy Aromatic (B) Amino/Acylamino Aromatic (C) Nonaromatic with carbon double bonds (D) Deprotonated Amine (E) Alkoxy Polyaromatic (F) Alkoxy Aromatic (G) Alkyl Aromatic (H) Saturated Aliphatic (I) Nitro Aromatic (2) Utilize an oxidation process that achieves optimal removal of the indicator compounds selected in paragraph (1) such that removal is no less than; (A) 0.5-log (69 percent) for each indicator compound representing the functional groups in paragraphs (1)(A) through (1)(G), and (B) 0.3-log (50 percent) for each indicator compound representing the functional groups in paragraphs (1)(H) and (1)(I). (3) Establish at least one surrogate or operational parameter that reflects the removal of at least five of the nine indicator compounds selected pursuant to paragraph (1) such that; (A) at least one of the five indicator compounds represents at least one

functional group in paragraphs (1)(A) through (1)(G), (B) at least one of the five indicator compounds represents at least one functional group in paragraphs (1)(H) or (1)(I), (C) at least one surrogate or operational parameter is capable of being monitored continuously, recorded, and have associated alarms, and (D) a surrogate or operational parameter, including the parameter in subparagraph (C), is identified that indicates when the process may no longer meet the criteria established in paragraph (2). (4) Conduct testing that includes confirmation of the findings of the occurrence study in paragraph (1) and provides evidence that the requirements of paragraphs (2) and (3) can be met with a full-scale oxidation process. The testing shall include challenge or spiking tests conducted to determine the removal differential under normal operating conditions utilizing, at minimum, the nine indicator compounds identified in paragraph (1). A project sponsor shall submit a testing protocol, as well as the subsequent results, to the Department for review and approval.

(1)

Perform an occurrence study on the project's municipal wastewater to identify indicator compounds and select a total of at least nine indicator compounds, with at least one from each of the functional groups in subparagraphs (A) through (I) below. A project sponsor shall submit an occurrence study protocol, as well as the subsequent results and chosen indicator compounds, to the Department for review and approval. (A) Hydroxy Aromatic (B) Amino/Acylamino Aromatic (C) Nonaromatic with carbon double bonds (D) Deprotonated Amine (E) Alkoxy Polyaromatic (F) Alkoxy Aromatic (G) Alkyl Aromatic (H) Saturated Aliphatic (I) Nitro Aromatic

(A)

Hydroxy Aromatic

(B)

Amino/Acylamino Aromatic

(C)

Nonaromatic with carbon double bonds

(D)

Deprotonated Amine

(E)

Alkoxy Polyaromatic

(F)

Alkoxy Aromatic

(G)

Alkyl Aromatic

(H)

Saturated Aliphatic

(I)

Nitro Aromatic

(2)

Utilize an oxidation process that achieves optimal removal of the indicator compounds selected in paragraph (1) such that removal is no less than; (A) 0.5-log (69 percent) for each indicator compound representing the functional groups in paragraphs (1)(A) through (1)(G), and (B) 0.3-log (50 percent) for each indicator compound representing the functional groups in paragraphs (1)(H) and (1)(I).

(A)

0.5-log (69 percent) for each indicator compound representing the functional groups in paragraphs (1)(A) through (1)(G), and

(B)

0.3-log (50 percent) for each indicator compound representing the functional groups in

paragraphs (1)(H) and (1)(I).

(3)

Establish at least one surrogate or operational parameter that reflects the removal of at least five of the nine indicator compounds selected pursuant to paragraph (1) such that; (A) at least one of the five indicator compounds represents at least one functional group in paragraphs (1)(A) through (1)(G), (B) at least one of the five indicator compounds represents at least one functional group in paragraphs (1)(H) or (1)(I), (C) at least one surrogate or operational parameter is capable of being monitored continuously, recorded, and have associated alarms, and (D) a surrogate or operational parameter, including the parameter in subparagraph (C), is identified that indicates when the process may no longer meet the criteria established in paragraph (2).

(A)

at least one of the five indicator compounds represents at least one functional group in paragraphs (1)(A) through (1)(G),

(B)

at least one of the five indicator compounds represents at least one functional group in paragraphs (1)(H) or (1)(I),

(C)

at least one surrogate or operational parameter is capable of being monitored continuously, recorded, and have associated alarms, and

(D)

a surrogate or operational parameter, including the parameter in subparagraph (C), is identified that indicates when the process may no longer meet the criteria established in paragraph (2).

(4)

Conduct testing that includes confirmation of the findings of the occurrence study in paragraph (1) and provides evidence that the requirements of paragraphs (2) and (3) can be met with a full-scale oxidation process. The testing shall include challenge or spiking tests conducted to determine the removal differential under normal operating conditions utilizing, at minimum, the nine indicator compounds identified in paragraph (1). A project sponsor shall submit a testing protocol, as well as the subsequent results, to the Department for review and approval.

(d)

In lieu of demonstrating that a sufficient oxidation process has been designed for implementation pursuant to subsection (c), a project sponsor may conduct testing demonstrating that the oxidation process will provide no less than 0.5-log (69 percent) reduction of 1,4-dioxane. (1) A project sponsor shall submit a testing protocol, as well as the subsequent results, to the Department for review and approval. The testing shall include challenge or spiking tests, using 1,4-dioxane, to demonstrate the proposed oxidation process will achieve the minimum 0.5-log reduction under the proposed oxidation process's normal full-scale operating conditions. (2) A project sponsor shall establish surrogate and/or operational parameters that reflect whether the minimum 0.5-log 1,4-dioxane reduction design criteria is being met. At least one surrogate or operational parameter shall be capable of being monitored continuously, recorded, and have associated alarms that indicate when the process is not operating as designed.

(1)

A project sponsor shall submit a testing protocol, as well as the subsequent results, to the Department for review and approval. The testing shall include challenge or spiking tests, using 1,4-dioxane, to demonstrate the proposed oxidation process will achieve the minimum 0.5-log reduction under the proposed oxidation process's normal

full-scale operating conditions.

(2)

A project sponsor shall establish surrogate and/or operational parameters that reflect whether the minimum 0.5-log 1,4-dioxane reduction design criteria is being met. At least one surrogate or operational parameter shall be capable of being monitored continuously, recorded, and have associated alarms that indicate when the process is not operating as designed.

(e)

During the full-scale operation of the oxidation process designed pursuant to subsection (c) or (d), a project sponsor shall continuously monitor the surrogate and/or operational parameters established pursuant to subsection (c)(3)(C) or (d)(2), as applicable. A project sponsor shall implement, in full-scale operation, the oxidation process as designed pursuant to subsection (c) or (d).

(f)

Within 60 days after completing the initial 12-months of monitoring pursuant to subsection (e), a project sponsor shall submit a report to the Department and Regional Board that includes: (1) the results of the monitoring performed in subsection (e); (2) the removal differential of the indicator compounds; (3) a description of the efficacy of the surrogate and/or operational parameters to reflect the removal differential of the indicator compounds; and (4) a description of actions taken, or to be taken, if the indicator compound removal did not meet the associated design criteria in subsection (c) or (d), the continuous surrogate and/or operational parameter monitoring in subsection (c)(3)(C) or (d)(2) fails to correspond to the differential indicator compound removal, or the surrogate and/or operational parameter established in subsection (c)(3)(D) or (d)(2) is not met.

(1)

the results of the monitoring performed in subsection (e);

(2)

the removal differential of the indicator compounds;

(3)

a description of the efficacy of the surrogate and/or operational parameters to reflect the removal differential of the indicator compounds; and

(4)

a description of actions taken, or to be taken, if the indicator compound removal did not meet the associated design criteria in subsection (c) or (d), the continuous surrogate and/or operational parameter monitoring in subsection (c)(3)(C) or (d)(2) fails to correspond to the differential indicator compound removal, or the surrogate and/or operational parameter established in subsection (c)(3)(D) or (d)(2) is not met.

(g)

Within 60 days after completing the initial 12 months of operation of the reverse osmosis process, a project sponsor shall submit a report to the Department and Regional Board describing the effectiveness of the treatment, process failures, and actions taken in the event the on-going monitoring in subsection (b) indicated that process integrity was compromised.

(h)

Each quarter, a project sponsor shall calculate what percent of results of the quarter's monitoring, conducted pursuant to subsections (b) and (e), did not meet the surrogate and/or operational parameter limits established to assure proper on-going performance of the reverse osmosis and oxidation processes. If the percent is greater than ten, within 45 days after the end of the quarter a project sponsor shall:(1) submit a report to the Department and Regional Board

describing the corrective actions planned or taken to reduce the percent to ten percent (10%) or less; and (2) consult with the Department and, if required, comply with an alternative monitoring plan approved by the Department.

(1)

submit a report to the Department and Regional Board describing the corrective actions planned or taken to reduce the percent to ten percent (10%) or less; and

(2)

consult with the Department and, if required, comply with an alternative monitoring plan approved by the Department.

(i)

Each month a project sponsor shall collect samples (grab or composite) representative of the effluent of the advanced treatment process and have the samples analyzed for contaminants having MCLs and notification levels (NLs). After 12 consecutive months with no results exceeding an MCL or NL, a project sponsor may apply for a reduced monitoring frequency. The reduced monitoring frequency shall be no less than quarterly. Monitoring conducted pursuant to this subsection may be used in lieu of the monitoring (for the same contaminants) required pursuant to sections 60320.212 and 60320.220. The effluent of the advanced treatment process shall not exceed an MCL.