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## Los Angeles Regional Water Quality Control Board

September 24, 2020

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Mr. Robert Ferrante, Chief Engineer and General Manager  
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**RECYCLED WATER POLICY CONSTITUENTS OF EMERGING CONCERN  
MONITORING AND REPORTING UPDATE - WASTE DISCHARGE REQUIREMENTS  
(WDRs) AND WATER RECLAMATION REQUIREMENTS (WRRs) MONITORING AND  
REPORTING PROGRAM (MRP) FOR THE RIO HONDO AND SAN GABRIEL COASTAL  
SPREADING GROUNDS – WATER REPLENISHMENT DISTRICT OF SOUTHERN  
CALIFORNIA, COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY, LOS  
ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS (ORDER NO. 91-100, CI-  
5728, FILE NO. 71-67)**

The California Regional Water Quality Control Board, Los Angeles Region (hereinafter Regional Water Board) makes the following findings and issues this letter pursuant to California Water Code (CWC) sections 13267 and 13383, to revise the Monitoring and Reporting Program (MRP) of Order No. 91-100 to require the Water Replenishment District of Southern California (WRD), the County Sanitation Districts of Los Angeles County (LACSD), and the Los Angeles County Department of Public Works (LACDPW) to develop a Quality Assurance Project Plan (QAPP) for constituents of emerging concern (CECs) monitoring and monitor, report and evaluate CEC Monitoring Parameters using a three-phased monitoring approach for production and use of recycled water for groundwater recharge at the Rio Hondo and San Gabriel Coastal Spreading Grounds.

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IRMA MUÑOZ, CHAIR | RENEE PURDY, EXECUTIVE OFFICER

## Background

- A. LACDPW, LACSD, and the WRD (collectively referred to as Project Sponsors) apply recycled wastewater to the Rio Hondo and San Gabriel Coastal Spreading Grounds (Montebello Forebay Spreading Grounds (MFSGs)).
- B. LACSD owns and operates the Whittier Narrows, San Jose Creek (SJC), and Pomona Water Reclamation Plants (WRPs). The SJC WRP has a design capacity of 100 million gallons per day (mgd) and is located at 1965 Workman Mill Road in Whittier, California. The Whittier Narrows WRP has a design capacity of 15 mgd and is located at 301 North Rosemead Boulevard, El Monte, California. The Pomona WRP has a design capacity of 15 mgd and is located at 295 Humane Way, Pomona, California.
- C. LACDPW owns and operates the MFSGs. A portion of the recycled water directed to surface waters from the WRPs is diverted to the MFSGs from the San Gabriel River or Rio Hondo channel, while the majority of the SJC WRP's recycled water, including product water from the Groundwater Reliability Improvement Project Advanced Water Treatment Facility (GRIP-AWTF), is delivered via pipeline to the MFSGs.
- D. WRD is responsible for groundwater management in the Central Basin. WRD purchases the recycled water from LACSD for groundwater recharge; however, LACDPW conducts the daily operations at the MFSGs.
- E. WRD owns and operates the GRIP-AWTF. The Regional Water Board issued Waste Discharge Requirements (WDRs) and Water Reclamation Requirements (WRRs), Order No. R4-2018-0129 on September 13, 2018 to regulate the surface spreading or subsurface injection of advanced-treated recycled water from the GRIP-AWTF. The surface spreading option is accomplished by mixing with tertiary-treated recycled effluent from the SJC WRP prior to delivery to the MFSGs. Constituents of emerging concern (CECs) for the advanced-treated water are monitored and reported in accordance with the MRP for Order No. R4-2018-0129 as revised. Recycled water from the GRIP-AWTF is also permitted to be discharged to the San Gabriel River under an NPDES permit (Order No. R4-2017-0187).
- F. The Regional Water Board issued WDRs and WRRs in Order No. 91-100 on September 09, 1991. This Order was subsequently amended by Order No. R4-2009-0048 and R4-2009-0048-A01 on April 02, 2009, and April 10, 2014, respectively. All the findings in the original order supporting issuance of requirements pursuant to Water Code sections 13267 and 13383 are applicable here and incorporated herein by reference. Order No. 91-100 as amended regulates the use of tertiary-treated recycled water from the WRPs. The tertiary-treated recycled water produced at these three facilities is either beneficially reused for irrigation or industrial uses, discharged to surface waters (regulated under separate individual National Pollutant Discharge Elimination System (NPDES) permits), or beneficially reused for surface spreading to recharge groundwater indirectly at the MFSGs.
- G. The Policy for Water Quality Control for Recycled Water (Recycled Water Policy) was adopted by the State Water Resources Control Board (State Water Board) on February 03, 2009 to streamline permitting for recycled water projects.

- H. On January 22, 2013 the Recycled Water Policy was amended with the adoption of Resolution No. 2013-0003 to specify monitoring requirements for CECs in recycled water used for groundwater recharge projects based on recommendations from the 2010 Science Advisory Panel on CECs in recycled water.
- I. On December 06, 2016 the State Water Board adopted Resolution No. 2016-0061, which directed staff to reconvene a Science Advisory Panel on CECs in recycled water and to propose an amendment to the Recycled Water Policy considering revised goals and mandates for statewide use of recycled water, clarification of recycled water monitoring and reporting requirements, recommendations for the development of representative, basin-wide groundwater monitoring networks, and an evaluation of the frequency of priority pollutant monitoring in recycled water. Resolution No. 2016-0061 also directed staff to consider a time schedule for regional water boards to review recycled water orders and permits, and to evaluate the nexus between the Recycled Water Policy and the Sustainable Groundwater Management Act (SGMA), groundwater recharge regulations, and reservoir water augmentation regulations.
- J. On December 11, 2018 the State Water Board adopted Resolution No. 2018-0057 to amend the Recycled Water Policy to address the provisions described in Resolution No. 2016-0061. The amended Recycled Water Policy (hereafter, Amendment) took effect on April 08, 2019 upon approval by the Office of Administrative Law. Resolution No. 2018-0057 directs the State Water Board Executive Director to issue orders pursuant to California Water Code section 13267 and Water Code section 13383 to implement the monitoring requirements of the Amendment, which shall supersede existing reporting requirements for recycled water to the extent of any conflict or duplication, wherever possible. The State Water Board has since determined that the monitoring requirements of the Amendment should be implemented by the Regional Boards on a permit-by-permit basis.
- K. The purpose of these revisions to the MRP of Order No. 91-100 as amended is to make the monitoring and reporting requirements consistent with the requirements in the Recycled Water Policy Sections 10 and 11.1 and Attachment A as amended on December 11, 2018. These revisions incorporate the following new requirements into the Monitoring and Reporting Program:
1. Development of a QAPP for CEC monitoring,
  2. Monitoring, reporting, and evaluating health-based CECs, performance indicator CECs, surrogates, and bioanalytical screening tools (collectively referred to as the CEC Monitoring Parameters), considering recommendations by the CEC Science Advisory Panel.
  3. Three-phased monitoring approach to determine the most appropriate CECs to monitor for the MFSGs.
- L. California Water Code section 13267, subdivision b(1) states, in part:
- “In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or, discharging, or who proposes to

discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.”

The burden of complying with these requirements, including costs, has already been evaluated by the State Water Board in adopting Resolution 2018-0057, which requires the monitoring described herein. The benefits to be obtained from the required monitoring are described in Resolution 2018-0057, in particular sections 10.1.1 through 10.1.3.

M. Water Code section 13383 is also referenced in the Recycled Water Policy, and allows the regional water boards to establish monitoring requirements for any person who introduces pollutants into a publicly owned treatment works or any person who owns or operates a publicly owned treatment works. Since the Whittier Narrows WRP, SJC WRP, and the Pomona WRP are POTWs, which treat municipal wastewater for beneficial reuse, the Regional Water Board has established monitoring requirements for these facilities.

N. The Regional Water Board finds that the presence of CECs in recycled water used for groundwater recharge could affect the quality of waters of the state. The revisions to the Monitoring and Reporting Program for Order No. 91-100 as amended pursuant to this letter will ensure the use of recycled water will not adversely impact human health or the environment.

### **Revisions to MRP**

Pursuant to Water Code sections 13267, subdivision (b)(1), and 13383, the Monitoring and Reporting Program (MRP) of Order No. 91-100, adopted by the California Regional Water Quality Control Board, Los Angeles Region on September 09, 1991, is hereby revised as follows:

A. Add a section titled “Constituents of Emerging Concern (CECs) Monitoring” after the Reporting Provisions on page T13:

#### Constituents of Emerging Concern (CECs) Monitoring

1. The following CEC monitoring requirements and Attachment H are consistent with the Recycled Water Policy, Resolution 2018-0057, adopted by the State Water Board on December 11, 2018 and the State Water Resources Control Board, Division of Drinking Water’s (DDW’s) recommendations. These

revisions include the incorporation of Attachment H: "CEC Phased Monitoring Requirements".

2. Monitoring Locations for Groundwater Recharge - Surface Application

Monitoring for bioanalytical screening tools, health-based CECs, performance indicator CECs, and surrogates shall be conducted: 1) following treatment prior to application to the surface spreading area, and 2) at monitoring well locations within the distance groundwater travels downgradient from the application site within 30 days. The proposed groundwater monitoring wells for this purpose is also required per the revisions to the MRP for Order No. R4-2018-0129 for the Groundwater Reliability Improvement Project (File No. 17-008). Duplication of data is not required between the two amendments (Refer to V.A.4 of Order No. R4-2018-0129).

3. The Project Sponsors shall revise and maintain a Quality Assurance Project Plan (QAPP) for monitoring CECs to ensure the project data are of known, consistent, and documented quality and that the monitoring is consistent with the Recycled Water Policy. The QAPP shall be developed using the Guidance for Quality Assurance Project Plans, EPA QA/G-5 (EPA/240/R-2/009, 2002) and the template issued by the State Water Board. The QAPP shall be submitted to the Regional Water Board within 90 days of the incorporation of these requirements into the MRP, and approved by the Regional Water Board or State Water Board's Division of Water Quality (DWQ) prior to beginning any sampling or analysis. The QAPP shall be updated and resubmitted to the Regional Water Board for approval when significant changes are made that would affect the overall data quality and use (e.g. using a new analytical chemistry laboratory) or at least annually if any changes are made.
4. The Project Sponsors shall submit the quality assurance data specified in the QAPP, including percent recoveries and acceptable recovery ranges for each analyte, to the Regional Water Board with each data set.
5. Laboratories shall use analytical methods that have been validated and approved for the analytes in the applicable matrix and can achieve the reporting limits in Tables T-1, T-2, and T-4 of this Amendment. This includes methods that have been approved by USEPA, the Standards Methods Committee, the American Society for Testing and Materials International, or other methods that have been validated and approved by the regional water boards or State Water Board for the analytes in the applicable matrix. The QAPP shall include minimum method validation requirements developed by the Regional Water Board in consultation with the State Water Board if proposing to (1) use a method that has not been validated and approved, (2) use a validated and approved method that has been modified, or (3) use a method for an application that is outside the intended use of the method (e.g., different matrix, new analyte).
6. A laboratory providing analyses of CECs and bioanalytical screening must hold a valid certificate of accreditation from the State of California Environmental Laboratory Accreditation Program (ELAP) for the analytical test methods or

analytes selected, if such methods or analytes are accredited by ELAP at the time that monitoring is required to begin. If ELAP accreditation for analytical test methods or an analyte becomes available after monitoring is initiated, then the laboratory providing analysis of CECs shall be accredited by ELAP for those methods or analytes within one year of such accreditation becoming available. If ELAP accreditation is unavailable for a method or an analyte, the Project Sponsors shall use a laboratory that has been accredited for a similar analytical method, instrumentation, or analyte until ELAP accreditation becomes available, unless otherwise approved by the Regional Water Board or approved by the State Water Board for bioanalytical screening tools.

7. The Project Sponsors shall also submit to the Regional Water Board within 90 days of the incorporation of this requirement into the MRP of Order No. 91-100, a letter report proposing monitoring wells and their geographic locations that satisfy the requirement to be within the distance groundwater travels downgradient from the application site in 30 days. This letter report shall also include the proposed surrogates for surface spreading monitoring. Regional Water Board approval is required before implementing the proposed monitoring wells and surrogates.
8. The Project Sponsors shall conduct a three-phased monitoring approach for the CEC monitoring parameters in Tables T-1, T-2, T-3 and T-4, which includes an initial assessment monitoring phase, followed by a baseline monitoring phase, and then a standard operation monitoring phase. The Project Sponsors shall conduct these phases in accordance with Attachment H.

**Table T-1. CECs to be Monitored at Groundwater Wells Located within a Distance Groundwater Travels Downgradient From the Application Site in 30 days**

Constituent	Relevance/ Indicator Type	Sample Type	Reporting Limit (µg/L)
1,4-dioxane	Health	grab	0.1
N-Nitrosodimethylamine (NDMA)	Health	grab	0.002
N-Nitrosomorpholine (NMOR)	Health	grab	0.002
Perfluorooctane sulfonate (PFOS)	Health	grab	0.0065
Perfluorooctanoic acid (PFOA)	Health	grab	0.007
Gemfibrozil	Performance	grab	0.01
Iohexol	Performance	grab	0.05

<b>Constituent</b>	<b>Relevance/ Indicator Type</b>	<b>Sample Type</b>	<b>Reporting Limit (µg/L)</b>
Sucralose	Performance	grab	0.1
Sulfamethoxazole	Performance	grab	0.01

**Table T-2. CECs to be Monitored (Surface Application)**

<b>Constituent</b>	<b>Relevance/ Indicator Type</b>	<b>Sample Type</b>	<b>Reporting Limit (µg/L)</b>	<b>Prior to Surface Application</b>
1,4-dioxane	Health	grab	0.1	X
NDMA	Health and Performance	grab	0.002	X
NMOR	Health	grab	0.002	X
PFOS	Health	grab	0.0065	X
PFOA	Health	grab	0.007	X
Gemfibrozil	Performance	grab	0.01	X
Iohexol	Performance	grab	0.05	X
Sucralose	Performance	grab	0.1	X
Sulfamethoxazole	Performance	grab	0.01	X

**Table T-3. Potential Surrogates for Surface Application**

<b>Constituent</b>	<b>Units</b>	<b>Sample Type</b>	<b>Prior to Surface Application</b>	<b>Approved Monitoring Wells</b>
Ammonia	mg/L	Grab	X	X
Dissolved Organic Carbon (DOC) or Total Organic Carbon (TOC)	mg/L	Grab	X	X
Nitrate	mg/L	Grab	X	X
Total fluorescence	Relative Fluorescence Units (RFU)	Grab	X	X

Constituent	Units	Sample Type	Prior to Surface Application	Approved Monitoring Wells
Ultraviolet (UV) Light Absorbance	%	Grab	X	X

**Table T-4. Bioanalytical Screening Tools for Surface Application**

Endpoint Activity	Example Relevant CECs	Reporting Limit (ng/L)	Adverse Effect	Sample Type	Prior to Surface Application	Monitoring Wells
Estrogen Receptor $\alpha$ (ER- $\alpha$ )	Estradiol, bisphenol A, nonylphenol	0.5	Feminization, impaired reproduction, cancer	Grab	X	X
Aryl Hydrocarbon receptor (AhR)	Dioxin-like chemicals, polycyclic aromatic hydrocarbons, pesticides	0.5	Cancer, impaired reproduction	Grab	X	X

B. The following additional requirements shall be included in the "Reporting Provisions" section on page T13:

8. For months during which CEC monitoring is conducted, the CEC reports shall be submitted with the regular monitoring reports and include a summary of monitoring results, calculations, and analyses for health-based CECs, performance indicator CECs, CEC surrogates, and bioanalytical screening tools.
9. Each annual report shall include the following CEC data:
  - a. The removal percentages for performance indicator CECs and surrogates.
  - b. Results of the MEC/MTL ratio calculations and any actions taken.
  - c. Results of the BEQ/MTL ratio calculations and any actions taken (when necessary).

#### 10. CEC Phased Monitoring Reports

After the completion of each CEC monitoring phase, the Project Sponsors shall submit a final report including a summary of all monitoring data collected, calculations performed, an assessment of the data, and the recommended monitoring frequency for the following phase. Since the phases for bioanalytical screening tools differ in length from the phases for health-based and performance indicator CECs, and surrogates, two separate CEC monitoring reports shall be submitted for each phase, one for surrogates, health-based and performance



indicator CECs, and another for bioanalytical screening tools. The final report for each phase shall be submitted to the Regional Water Board within 90 days of receiving the results of the final sample collected for that phase.

If you have any questions, please contact Steven Webb via email at [steven.webb@waterboards.ca.gov](mailto:steven.webb@waterboards.ca.gov) or Jeong-Hee Lim via email at [jeong-hee.lim@waterboards.ca.gov](mailto:jeong-hee.lim@waterboards.ca.gov).

Sincerely,

Renee Purdy  
Executive Officer

Enclosure: Attachment H: Constituents of Emerging Concern (CECs) Phased  
Monitoring Requirements

cc: Tricia Lee, Laura McLellan, Andrew Hamilton, State Water Resources  
Control Board, Division of Water Quality  
Saeed Hafeznezami, Faraz Asad, Randy Barnard, Brian Bernados,  
State Water Resources Control Board, Division of Drinking Water

## **ATTACHMENT H – Constituents of Emerging Concern (CECs) Phased Monitoring Requirements**

The Project Sponsors shall conduct a three-phased monitoring approach for the CEC monitoring parameters. This approach includes an initial assessment monitoring phase, a baseline monitoring phase, and a standard operation monitoring phase. The purpose of phased monitoring is to allow the Los Angeles Regional Water Quality Control Board (Regional Water Board) to review monitoring results for the CEC monitoring required in the Monitoring and Reporting Program (MRP) at each phase and to refine the specific monitoring requirements based on the monitoring results and findings of the previous phase. Each CEC monitoring phase is described in detail below.

The Project Sponsors may submit existing CEC monitoring data for the health-based CECs and performance indicator CECs, surrogates for CECs, and bioanalytical screening tools from the Facility permitted under the MRP to satisfy the requirements of the initial assessment or baseline monitoring phase. If the Regional Water Board determines the existing CEC monitoring data meets the intent of the initial assessment phase, the Regional Water Board may allow the Project Sponsors to initiate the baseline monitoring phase. If the Regional Water Board determines the existing CEC monitoring data meets the intent of the baseline monitoring phase, the Regional Water Board may allow the Project Sponsors to initiate the standard operation monitoring phase.

For CECs that overlap with chemicals with Notification Levels (1,4-Dioxane, perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and N-nitrosodimethylamine (NDMA)) or surrogates that overlap with Primary MCLs (Nitrate), monitoring may not be reduced to less than quarterly at the recycled water monitoring locations or at monitoring wells regardless of monitoring phase without State Water Board, Division of Drinking Water (DDW) approval.

If the facility is not operational for part of a monitoring period, the Project Sponsor must collect samples for twelve months for monthly samples, four quarters for quarterly samples, twice per year for semiannual samples, and once per year for annual samples to satisfy a 1-year monitoring requirement.

### **I. INITIAL ASSESSMENT MONITORING PHASE**

The monitoring requirements for the initial assessment phase applies to this facility because this project uses the recycled water for indirect potable reuse using surface spreading.

The purpose of the initial assessment phase is to: (1) identify the occurrence of health-based CECs, performance indicator CECs, and surrogates in recycled water for groundwater recharge; (2) determine treatment effectiveness; (3) define the project-specific performance indicator CECs and surrogates to monitor during the baseline

monitoring phase; (4) specify the expected removal percentages for performance indicator CECs and surrogates; and (5) gather bioactivity data for ER- $\alpha$  and AhR bioanalytical screening tools to determine the range of responses for the bioassays for standardized water quality monitoring.

The Project Sponsors shall monitor for the constituents in Tables T-1, T-2, T-3, and T-4 of the MRP consistent with the initial assessment phase requirements. Following completion of the initial assessment monitoring phase, the Project Sponsors shall submit the data to the Regional Water Board for evaluation and determination of the appropriate monitoring requirements for the baseline monitoring phase.

#### **A. Monitoring for Health-Based CECs, Performance Indicator CECs, and Surrogates**

1. The Project Sponsors shall conduct an initial assessment monitoring phase consistent with Table 1 of this attachment for one year for each of the health-based CECs and performance indicator CECs listed in Table T-2 of the MRP and project specific surrogates identified in Table T-3 of the MRP, or other surrogates proposed by the Project Sponsors that are indicative of CEC removal through individual unit processes.
2. The Project Sponsors shall evaluate data from performance indicator CECs and surrogates and prepare an updated Table 2 of this attachment with actual removal percentages for the Facility and submit to the Regional Water Board with the initial assessment monitoring data.
3. Following each sampling event, the Project Sponsors shall evaluate monitoring results for health-based CECs using the direction in section IV.B. of this attachment and implement appropriate response actions. The Project Sponsors shall also evaluate monitoring results for surrogates and evaluate the suitability of the surrogates.

#### **B. Monitoring for Bioanalytical Screening Tools**

1. The Project Sponsors shall conduct an initial assessment monitoring phase consistent with Table 1 of this attachment for three years for each of the bioanalytical screening tools listed in Table T-4 of the MRP. The monitoring frequency may be increased from the quarterly frequency indicated in Table 1 by the Regional Water Board if the analysis conducted as part of section IV. of this attachment indicates that more frequent monitoring is a required response action.
2. Following each sampling event, the Project Sponsors shall evaluate monitoring results for bioanalytical screening tools. The Project Sponsors may elect to follow the response actions for bioanalytical screening tools using the direction in section IV.C. of this attachment, but implementation of the response actions during the initial assessment monitoring phase is not required.

**Table 1. Monitoring Phase Requirements: Surface Application**

<b>Constituent</b>	<b>Initial Assessment Monitoring Frequency</b>	<b>Baseline Monitoring Frequency</b>	<b>Standard Operation Monitoring Frequency</b>	<b>Monitoring Locations</b>	<b>Notes</b>
Health-Based CECs: Refer to Table T-2	Quarterly	Semiannually	Semiannually or Annually	Prior to surface application and at the approved monitoring wells	Notes a and b
Performance Indicator CECs: Refer to Table T-2	Quarterly	Semiannually	Semiannually or Annually	Prior to surface application and at the approved monitoring wells	Notes a and b
Surrogates: Refer to Table T-3.	Weekly prior to surface application and Monthly for the monitoring wells, (Reduced monitoring frequency after 3 months if approved)	Based on Findings of the Initial Assessment Phase	Based on Findings of the Baseline Monitoring Phase	Prior to surface application and at the approved monitoring wells.	Notes a, b, and c
Bioanalytical Screening Tools: Refer to Table T-4	Quarterly	Quarterly	Semiannually or Annually	Prior to surface application and at the approved monitoring wells	Notes a and b

**Footnotes for Table 1**

- a. More frequent monitoring may be required per section IV.B and IV.C of this attachment. Notification level monitoring and sucralose monitoring is monthly for the first year (Title 22 of the California Code of Regulations (22 CCR) § 60320.201) then quarterly (22 CCR § 60320.120).
- b. Reduction in frequency is contingent upon approval by DDW, State Water Resources Control Board, Division of Water Quality (DWQ), and Regional Water Board.
- c. Nitrate monitoring is at least quarterly in monitoring wells per 22 CCR § 60320.126 and § 60320.226.

**End of Footnotes for Table 1**

**II. BASELINE MONITORING PHASE**

The Project Sponsors shall initiate the baseline monitoring phase upon completion of the initial assessment phase or upon receiving approval from the Regional Water Board to proceed with this phase given the existing data for the Facility meet the intent of the initial assessment phase.

The purpose of the baseline monitoring phase is to: (1) gather occurrence data for health-based CECs; (2) evaluate performance indicator CECs and surrogates and determine treatment effectiveness; (3) gather bioactivity data for ER-α and AhR bioanalytical screening tools and pilot test the framework for response actions; and (4)

assess the list of health-based CECs, performance indicator CECs, surrogates, and bioanalytical screening tools and identify an appropriate list of constituents to monitor the removal of CECs and treatment system performance in the standard operation monitoring phase of the Facility.

#### **A. Monitoring for Health-Based CECs, Performance Indicator CECs, and Surrogates**

1. The Project Sponsors shall conduct a baseline monitoring phase consistent with Table 1 of this attachment for three years for each of the health-based CECs in Table T-2 of the MRP, and performance-based CECs and surrogates identified by the Regional Water Board.
2. Performance indicator CECs and surrogates that exhibited reduction by unit processes and/or provided an indication of operational performance shall be selected for monitoring in the baseline monitoring phase. Surrogates not reduced through a unit process are not good indicators of the unit's intended performance. For example, soil aquifer treatment may not effectively lower electrical conductivity. Therefore, electrical conductivity may not be a good surrogate for soil aquifer treatment.
3. If a performance indicator CEC listed in Table T-2 of the MRP is not a good indicator of CEC removal, the Project Sponsors shall propose an alternative performance indicator CEC to monitor that is representative of the constituent group. This performance indicator CEC shall be subject to approval by the Regional Water Board.
4. The Project Sponsors shall evaluate data from performance indicator CECs and surrogates and prepare an updated Table 2 with the actual removal percentages for the Facility and submit to the Regional Water Board with the baseline monitoring data.
5. Following each sampling event, the Project Sponsors shall evaluate monitoring results for health-based CECs using the direction in section IV.B. of this attachment and implement appropriate response actions.

#### **B. Monitoring for Bioanalytical Screening Tools**

1. The Project Sponsors shall conduct a baseline monitoring phase consistent with Table 1 of this attachment for one year for each of the bioanalytical screening tools listed in Table T-4 of the MRP.
2. Following each sampling event, the Project Sponsors shall evaluate monitoring results for bioanalytical screening tools using the direction in section IV.C. of this attachment and implement appropriate response actions.

### **III. STANDARD OPERATION MONITORING PHASE**

The Project Sponsors shall initiate the standard operation monitoring phase upon completion of the baseline monitoring phase or upon receiving approval from the Regional Water Board to proceed with this phase given the existing data for the Facility.

The purpose of the standard operation monitoring phase is to monitor CECs under standard operating conditions at the Facility. In this phase, the Regional Water Board in consultation with the State Water Board will identify a list of health-based CECs, performance-based CECs, surrogates, and bioanalytical screening tools to monitor based on the Facility's data from the first two monitoring phases.

#### **A. Monitoring for Health-Based CECs, Performance Indicator CECs, and Surrogates**

1. For the standard operation monitoring phase, the Project Sponsors shall conduct the monitoring requirements in Table 1 of this attachment while the facility is operating.
2. The Project Sponsors may request removal of a health-based CEC from the required CEC monitoring list if the monitoring results meet the conditions of the minimum threshold level presented in Section IV.B of this attachment and it is not otherwise required to be sampled (e.g. constituents with notification levels, MCLs, or as specified by DDW).
3. Performance indicator CECs and surrogates that exhibited reduction by a unit process and/or provided an indication of operational performance shall be selected for monitoring of standard operations. If a performance indicator CEC is not a good indicator, the Project Sponsors shall propose an alternative performance indicator CEC representative of the constituent group to monitor. This performance indicator CEC shall be subject to approval by the Regional Water Board.
4. With the exception of pollutants with notification levels, monitoring for health-based CECs and performance indicator CECs shall be conducted semi-annually unless the project demonstrates consistency in treatment effectiveness removal of CECs, treatment operational performance, and appropriate recycled water quality. These projects may be monitored for health-based CECs and performance indicator CECs on an annual basis.
5. Following each sampling event, the Project Sponsors shall evaluate monitoring results for health-based CECs using the direction in section IV.B. of this attachment and implement appropriate response actions.
6. If evaluation of monitoring results indicates a concern, such as finding a health-based CEC above the thresholds described in Table 3 of this attachment or a decline in removal of a performance indicator CEC from the performance levels established during the initial and baseline monitoring phases, the Regional Water

Board may require more frequent monitoring to further evaluate the effectiveness of the treatment process. Additional actions may also be warranted, which may include, but are not limited to, resampling to confirm a result, additional monitoring, implementation of a source identification program, toxicological studies, engineering removal studies, and/or modification of facility operation.

## **B. Monitoring for Bioanalytical Screening Tools**

1. The Regional Water Board may remove a bioanalytical screening tool from the required monitoring list if monitoring results meet the conditions of the minimum threshold level presented in Table 5 of this attachment.
2. Following each sampling event where bioassay monitoring is required, the Project Sponsors shall evaluate monitoring results for bioanalytical screening tools using the direction in section IV.C. of this attachment and implement appropriate response actions.
3. Semiannual monitoring for bioanalytical screening tools shall be conducted, unless the project demonstrates consistency in treatment effectiveness in removal of CECs, treatment operational performance, and appropriate recycled water quality. These projects may be monitored for CECs and with bioanalytical screening tools on an annual basis. Monitoring frequencies for CECs and surrogates for standard operation monitoring are specified in Table 1 of this attachment.

## **IV. EVALUATION OF CECS, SURROGATES, AND BIOANALYTICAL SCREENING TOOL MONITORING RESULTS**

This section describes the approaches for evaluating treatment process performance and health-based CEC and bioanalytical screening tool monitoring results. Monitoring results for performance indicator CECs and surrogates shall be used to evaluate the operational performance of a treatment process and the effectiveness of a treatment process in removing CECs. For evaluation of health-based CEC and bioanalytical screening tool monitoring results, a multi-tiered approach of thresholds and corresponding response actions is specified in section IV.B. and IV.C. of this attachment, respectively. The evaluation of monitoring results shall be included in monitoring reports submitted to the Regional Water Board.

Evaluation of CECs and surrogates is a separate requirement from compliance with Title 22 requirements for recycled water (1,4-Dioxane, PFOA, PFOS, NDMA) and for monitoring wells (Nitrate). Compliance with these Title 22 requirements is described in 22 CCR § 60320.110, § 60320.120, and § 60320.126.

If a pollutant is not detected in a sample, one half the detection limit shall be used to evaluate the CEC results.

## **A. Evaluation of Performance Indicator CEC and Surrogate Results**

1. The effectiveness of a treatment process to remove CECs shall be evaluated by determining the removal percentages for performance indicator CECs and surrogates. The removal percentage is the difference in the concentration of a compound in recycled water prior to and after a treatment process (soil aquifer treatment), divided by the concentration prior to the treatment process and multiplied by 100.

$$\text{Removal Percentage} = ([X_{\text{in}} - X_{\text{out}}]/X_{\text{in}}) (100)$$

$X_{\text{in}}$  - Concentration in recycled water prior to a treatment process

$X_{\text{out}}$  - Concentration in recycled water after a treatment process

During the initial assessment, the recycled water producer shall monitor performance to determine removal percentages for performance indicator CECs and surrogates. The removal percentages shall be confirmed during the baseline monitoring phase. The established removal percentages for each project shall be used to evaluate treatment effectiveness and operational performance.

2. For groundwater recharge by surface application, the removal percentage shall be determined by comparing the quality of recycled water applied to a surface spreading area to the quality of groundwater at monitoring wells.
3. The removal percentages for surrogates shall be determined based on weekly values for TOC (Refer to Table T-3 of the MRP).

## **B. Evaluation of Health-based CEC Results**

The Project Sponsors shall evaluate the health-based CEC monitoring results. To determine the appropriate response actions, the Project Sponsors shall compare measured environmental concentrations (MECs) to their respective monitoring trigger levels (MTLs) listed in Table 2 of this attachment to determine MEC/MTL ratios. The Project Sponsors shall compare the calculated MEC/MTL ratios to the thresholds specified in Table 3 and implement the response actions corresponding to the threshold.

For surface application, the removal percentage shall be determined by comparing the quality of the recycled water applied to a surface spreading area to the quality of groundwater at monitoring wells. The removal percentage shall be adjusted to account for differences in concentrations due to dilution from potable water applied to the application site, stormwater applied to the application site, tertiary-treated effluent applied to the application site, advanced-treated water applied to the application site, and native groundwater (aka maximum background concentrations already present in and around the MFSG). The removal percentage shall also be adjusted to account for CECs in these waters. The Project Sponsors shall include



the supporting information in the CEC Phased Monitoring Reports to justify the calculated removal percentage.

**Table 2. Monitoring Trigger Levels and Removal Percentages**

<b>Constituent/ Parameter</b>	<b>Relevance/ Indicator Type/ Surrogate</b>	<b>Monitoring Trigger Level (µg/L)</b>	<b>Removal Percentages</b>
1,4-dioxane	Health	1	---
NDMA	Health & Performance	0.010	To be determined
N-nitrosomorpholine (NMOR)	Health	0.012	---
PFOS	Health	0.013	---
PFOA	Health	0.014	---
Gemfibrozil	Performance	---	To be determined
Iohexol	Performance	---	To be determined
Sucralose	Performance	---	To be determined
Sulfamethoxazole	Performance	---	To be determined
Ammonia	Surrogate	---	To be determined
Nitrate	Surrogate	---	To be determined
DOC or TOC	Surrogate	---	To be determined
Total Fluorescence	Surrogate	---	To be determined
UV Absorbance	Surrogate	---	To be determined

**Table 3. MEC/MTL Thresholds and Response Actions for Health-Based CECs**

<b>MEC/MTL Threshold</b>	<b>Response Action</b>
If greater than 75 percent of the MEC/MTL ratio results for a CEC are less than or equal to 0.1 during the baseline monitoring phase and/or subsequent monitoring	A) After completion of the baseline monitoring phase, consider requesting removal of the CEC from the monitoring program from the Executive Officer of the Regional Water Board.
If MEC/MTL ratio is greater than 0.1 and less than or equal to 1	B) Continue to monitor.
If MEC/MTL ratio is greater than 1 and less than or equal to 10	C) Check the data. Continue to monitor.
If MEC/MTL ratio is greater than 10 and less than or equal to 100	D) Check the data, resample within 72 hours of notification of the result and analyze to confirm CEC result. Continue to monitor.
If MEC/MTL ratio is greater than 100	E) Check the data, resample within 72 hours of notification of the result and analyze to confirm CEC result. Continue to monitor.

MEC/MTL Threshold	Response Action
	<p>Contact the Regional Water Board, DWQ, and DDW to discuss additional actions.</p> <p>(Additional actions may include, but are not limited to, additional monitoring, toxicological studies, engineering removal studies, modification of facility operation, implementation of a source identification program, and monitoring at additional locations.)</p>

### C. Evaluation of Bioanalytical Screening Tool Results

The Project Sponsors shall evaluate bioanalytical assay monitoring results. During the baseline monitoring phase and standard operation monitoring phase, the Project Sponsors shall determine the appropriate response actions. The Project Sponsors shall compare bioanalytical equivalent concentrations (BEQs) to their respective MTLs listed in Table 4 of this attachment to determine BEQ/MTL ratios. The Project Sponsors shall compare the calculated BEQ/MTL ratios to the thresholds presented in Table 5 of this attachment and implement the response actions corresponding to the threshold.

For groundwater recharge – surface application, the Project Sponsors shall evaluate the bioanalytical screening results for samples collected from the groundwater monitoring wells.

**Table 4. Required Equivalency Agonists and Monitoring Trigger Levels for Bioanalytical Screening Tools**

Constituent/ Parameter	Equivalency Agonist	Monitoring Trigger Level (MTL) (ng/L)
Estrogen Receptor- $\alpha$	17-beta-estradiol	3.5
Aryl Hydrocarbon receptor (AhR)	2,3,7,8- tetrachlorodibenzo-p- dioxin (TCDD)	0.5

**Table 5. BEQ/MTL Thresholds and Response Actions for Bioanalytical Screening Tools**

BEQ/MTL Threshold	Response Action
If BEQ/MTL ratio is consistently less than or equal to 0.15 for ER- $\alpha$ or 1.0 for AhR	A) After completion of the baseline monitoring phase, consider decreasing monitoring frequency or requesting removal of the endpoint from the monitoring program.

BEQ/MTL Threshold	Response Action
If BEQ/MTL ratio is greater than 0.15 and less than or equal to 10 for ER- $\alpha$ or greater than 1.0 and less than or equal to 10 for AhR	B) Continue to monitor.
If BEQ/MTL ratio is greater than 10 and less than or equal to 1000	<p>C) Check the data, resample within 72 hours of notification of the result and analyze to confirm bioassay result.</p> <p>Continue to monitor.</p> <p>Contact the Regional Water Board, DWQ, and DDW to discuss additional actions, which may include, but are not limited to, targeted analytical chemistry monitoring, increased frequency of bioassay monitoring, and implementation of a source identification program.</p>
If BEQ/MTL ratio is greater than 1000	<p>D) Check the data, resample within 72 hours of notification of the result and analyze to confirm bioassay result.</p> <p>Continue to monitor.</p> <p>Contact the Regional Water Board, DWQ, and DDW to discuss additional actions, which may include, but are not limited to, targeted and/or non-targeted analytical chemistry monitoring, increased frequency of bioassay monitoring, toxicological studies, engineering removal studies, modification of facility operation, implementation of a source identification program, and monitoring at additional locations.</p>