



Recycled Water Policy Amendment CEC monitoring requirements



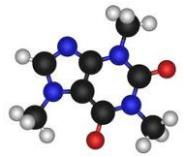
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State Water Resources Control Board

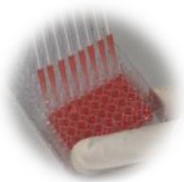
June 11, 2018

Proposed CEC Monitoring

Groundwater Recharge & Reservoir Water Augmentation



Targeted chemistry



Bioanalytical screening tools



QA/QC requirements



Attachment A

1. QA/QC
2. CEC monitoring requirements
3. Monitoring locations
4. Phased monitoring approach
5. Evaluation of monitoring results



CEC monitoring requirements

	Groundwater recharge – surface spreading	Groundwater recharge – subsurface injection & Reservoir water augmentation
Targeted Chemistry - Health	1,4-dioxane	1,4-dioxane
	NDMA	NDMA
	NMOR	NMOR
Targeted Chemistry - Performance	Gemfibrozil	-
	Iohexol	-
	Sucralose	Sucralose
	Sulfamethoxazole	Sulfamethoxazole
Surrogates	Ammonia, DOC, Nitrate, Total fluorescence, UV absorbance	EC, DOC, UV absorbance
Bioanalytical	ER- α	ER- α
	AhR	AhR

Bioanalytical Screening Tools

Endpoint Activity	Relevant CECs	Adverse effect	Reporting Limit (ng/L)
Estrogen receptor-α (ER-α)	Estradiol, bisphenol A, nonylphenol	Feminization, impaired reproduction, cancer	0.5
Aryl hydrocarbon receptor (AhR)	Dioxin-like chemicals, PAHs, pesticides	Cancer, impaired reproduction	0.5

Monitoring Locations

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- Following treatment, prior to application
- *For surface spreading:* monitoring wells downgradient from application site (≤ 30 -day travel time)

Science Advisory Panel Recommendations

- Following treatment, prior to application
i.e., end of advanced recycled water treatment train, just prior to discharge into infiltration pond/
groundwater injection well/
surface reservoir

Phased Monitoring Approach

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1. Initial Assessment (1 year)
Quarterly
2. Baseline (3 years)
~Semi-annual
3. Standard Operating (ongoing)
~Semi-annual

Science Advisory Panel Recommendations

1. Data collection exercise
Quarterly
2. Pilot evaluation
3. Full implementation

Evaluation of Monitoring Results

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- Investigatory response actions that aim to identify substances responsible for bioactivity
- Analogous to targeted chemistry responses

Science Advisory Panel Recommendations

- Aim to identify substances responsible for bioactivity
- Response actions not recommended until 2nd phase of monitoring

Evaluation of Monitoring Results

Constituent/ Parameter	Equivalency Agonist	Monitoring Trigger Level (ng/L)
ER- α	17-beta- estradiol	3.5
AhR	TCDD (dioxin)	0.5

Evaluation of Monitoring Results

Calculation of bioanalytical equivalent concentrations (BEQs)

- Output from each bioassay is referenced to an equivalency agonist (strong agonist for the receptor) to generate a BEQ
- Relate the bioassay output to the same output level on the equivalency agonist calibration curve to generate the BEQ
- Compare the BEQ to the monitoring trigger level (MTL)

Evaluation of Monitoring Results

BEQ/MTL Threshold	Response Action
BEQ/MTL consistently < 0.1	Consider decreasing monitoring frequency or eliminating requirement for inclusion of endpoint
$0.1 < \text{BEQ/MTL} \leq 10$	Continue to monitor.
$10 < \text{BEQ/MTL} \leq 1000$	<ul style="list-style-type: none">-Check the data, resample immediately and analyze to confirm bioassay result.-Continue to monitor.-Contact Regional Board and State Board to discuss additional actions.
BEQ/MTL > 1000	<ul style="list-style-type: none">-Check the data, resample immediately and analyze to confirm bioassay result.-Continue to monitor.-Contact Regional Board and State Board to discuss additional actions.

Other Panel Recommendations

- Bioanalytical advisory group
- Water Boards programmatic changes
 - Develop a more flexible, responsive program to update CEC monitoring recommendations more frequently
 - Develop internal protocols to collect and review data, update MTLs
 - Develop a data management system

Next Steps

- Develop program level **Data Quality Objectives** for targeted chemistry and bioanalytical tools
- Work with labs and **ELAP** to validate and accredit methods
- Bioanalytical tools development grant

Recycled Water Policy Amendment

**Public hearing:
June 19, 2018**

Sacramento, CA and webcast

**Written comments due:
12 noon June 26, 2018**

- Email: commentletters@waterboards.ca.gov

Please title the subject line: “Comment Letter – Proposed Recycled Water Policy Amendment”

