ORANGE COUNTY WATER DISTRICT
ORANGE COUNTY'S GROUNDWATER AUTHORITY
SINCE 1933

Sent via Electronic Mail to: CalEnviroScreen@oehha.ca.gov

June 2, 2014

CalEnviroScreen
c/o John Faust, Chief, Community Assessment & Research Section
Office of Environmental Health Hazard Assessment
1515 Clay Street, Suite 1600
Oakland, CA 94612

Re: Draft CalEnviroScreen 2.0 Screening Tool

Dear Dr. Faust,

The Orange County Water District (OCWD) is an agency formed by the State of California in 1933 to protect and manage the Orange County groundwater basin. OCWD is located in a highly urbanized area of northern Orange County with 32 water utilities serving a population of approximately 2.4 million people. Over 200 large and small system wells within our groundwater basin provide approximately 70 percent of the drinking water. On behalf of our basin Groundwater Producers (GWPs), OCWD assumes all water quality monitoring, analytical, and reporting responsibilities to comply with state and federal drinking water regulations for their groundwater sources (i.e., drinking water wells).

OCWD coordinates closely with our GWPs and provides oversight on relevant drinking water quality issues, drinking water regulations (e.g., drinking water standards) and other guidance documents that directly and indirectly affect GWPs and communication to their consumers of providing safe, high quality drinking water that meets federal and state drinking water standards. OCWD assists water utilities with preparation of (1) the annual groundwater source testing monitoring schedules per the California Department of Public Health (CDPH) and the U.S. Environmental Protection Agency (EPA) compliance timelines, (2) extensive and comprehensive groundwater quality data files and statistics to aid in preparation of required CDPH's Annual Consumer Confidence Report (CCR), (3) triennial assessment and evaluation of vulnerability assessments of groundwater sources for determination of monitoring frequencies for the respective standardized monitoring framework periods, and (4) triennial preparation of Public Health Goals report on groundwater source water quality.

OCWD has been an active participant in the public workshops and public outreach efforts provided by CalEPA/OEHHA to discuss and provide information on the draft CES

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2.0 and the overall goals and objectives of developing the CES 2.0. We are writing to express our concerns with the accelerated schedule to add the new Drinking Water Indicator (DWI) to the draft CES 2.0 with focus on the (1) methodology of using a contaminant's Public Health Goal (PHG) to produce a toxicity ratio that is subsequently used as a toxicity-weighted drinking water quality index for each chemical contaminant, (2) technical issues associated with quality assurance of raw data used for CES 2.0, (3) absence of water utility input on appropriate raw data to use in CES 2.0, and (4) DWI scores may not accurately reflect the quality of water served within each census tract with the potential of providing conflicting information on the quality of water provided to consumers.

OCWD appreciates the opportunity to comment on the California Environmental Protection Agency's (CalEPA) and the Office of Environmental Health Hazard Assessment's (OEHHA) draft California Communities Environmental Health Screening Tool, Version 2.0 (draft CES 2.0) and provide the following comments for your consideration in finalizing the CES 2.0.

1.0 Drinking Water Quality Indicator: Methodology and Use of Public Health Goals

1.1 Toxicity Ratios and Use of Public Health Goals

The draft CES 2.0 selected twenty chemicals as a subset of regulated contaminants to represent the overall quality of drinking water served to consumers. The drinking water quality methodology calculates a time-weighted average for each contaminant, which is then divided by the contaminant's public health goal (PHG) to produce a toxicity ratio:

$$\text{Toxicity ratio} = \frac{\text{time-weighted average}}{\text{PHG}}$$

As shown in the Table 1 (chemical list from Drinking Water Quality Appendix page 37), there are 12 carcinogenic contaminants and 8 non-carcinogenic contaminants and their respective public health goal. Table 1 includes additional information for each of the contaminants (except for TCR, as noted in table footnotes) including the detection limit for reporting purposes (DLR) and the maximum contaminant level (MCL) or drinking water standard. The draft CES 2.0 methodology calculates a toxicity ratio for each contaminant. The toxicity ratios for the carcinogens and non-carcinogens contaminants were combined separately to produce two toxicity-weighted drinking water indices. The toxicity-weighted indices are ranked statewide to yield a relative ranking of all CA census tracts for carcinogens and non-carcinogens. The relative rankings are combined to produce a drinking water quality metric (i.e., percentile) for each census tract.

OCWD is very concerned with the use of PHG to calculate the toxicity ratio for the 19 chemicals (excludes TCR violation). Reviewing the draft CES 2.0 materials and examples, the use of PHGs significantly skews the toxicity ratio results as illustrated in Table 1. For perspective comparison, the toxicity ratio for each chemical has been

calculated using the MCL, DLR and the MCL as the three metrics for the "time-weighted average (TWA)".

Table 1

Toxicity Ratio = Time-weighted average concentration of contaminant/PHG					If [conc.] = MCL the toxicity ratio would be:	If [conc.] = DLR the toxicity ratio would be:	If [conc.] = DLR the toxicity ratio would be:
Contaminant	**DLR**	**PHG**	**Units**	**MCL**	**Toxicity Ratio = MCL/PHG**	**Toxicity Ratio = DLR/PHG**	**Toxicity Ratio = DLR/MCL**
Carcinogenic Contaminants (12)							
Arsenic	2	0.004	ug/L	10	**2500**	**500**	**0.2**
Benzene	0.5	0.15	ug/L	1	6.7	3.33	0.5
Cadmium	1	0.04	ug/L	5	125	25	0.2
Carbon Tetrachloride	0.5	0.1	ug/L	0.5	5	5	1.0
Dibromochloropropane (DBCP)	0.01	0.0017	ug/L	0.2	117.6	5.88	0.1
Hexavalent Chromium	1	0.02	ug/L	10	500	50	0.1
MTBE	3	13	ug/L	13	1.0	0.23	0.2
Radium-226	1	0.05	pCi/L	5	100	20	0.2
PCE	0.5	0.06	ug/L	5	83.3	8.33	0.1
Total Trihalomethanes (THMs)	1	0.8*	ug/L	80	100	1.25	1.3
TCE	0.5	1.7	ug/L	5	2.9	0.29	0.1
Uranium	1	0.43	pCi/L	20	46.5	2.33	0.1
Non-carinogenic Contaminants (8)							
Barium	0.1	2	mg/L	1	0.5	0.05	0.1
Lead	5	0.2	ug/L	15	75	25	0.3
Mercury	1	1.2	ug/L	2	1.7	0.83	0.5
Nitrate	2	45	mg/L	45	**1.0**	0.04	0.044
Perchlorate	4	6	ug/L	6	1.0	0.67	0.7
Toluene	0.5	150	ug/L	150	1.0	0.003	0.003
Total Coliform Rule (TCR)		--					
Xylene	0.5	1800	ug/L	1750	0.97	0.0003	0.0003

Notes:

DLR = CDPH detection limit for reporting purposes

PHG = OEHHA Public Health Goal

MCL = Maximum contaminant level (i.e., drinking water standard)

THMs* = 0.8 ug/L proposed PHG 6/19/2009; 9/9/2010

TCR = Total coliform rule - assigned 1.5 factor per violation

- <u>Example 1 – TWA = MCL</u>

The calculated toxicity ratio listed in Table 1 assumes that the time-weighted average concentration of each of the listed 19 chemicals is equal to the drinking water standard or MCL (column 6). For arsenic, the calculated toxicity ratio is 2500 in comparison to nitrate with a toxicity ratio of 1. As shown by the toxicity values listed in column 6 (MCL/PHG), the overall relative toxicity score for either cancer or non-cancer causing chemicals is significantly dominated by the presence of arsenic, regardless of the arsenic concentration, because of the very low PHG (0.004 parts per billion or ug/L) in the calculation. The calculated arsenic cancer score will be substantially higher than the non-cancer chemicals and overshadows the cancer score of the other eleven cancer chemicals.

To place additional perspective on the dominance or weight that arsenic produces in the overall drinking water score relative to protection of public health, consider two water

systems that have the following source water quality for arsenic and nitrate delivered to consumers:

System	Chemical	TWA	PHG	Toxicity Ratio	Comparison to MCL	Health Impact: Acute or Chronic
A	Arsenic	0 ug/L (TWA = 1.9 ug/L)	0.004 ug/L	0	Below MCL and DLR	Chronic
A	Nitrate	90 mg/L	45 mg/L	**2**	2 times the MCL	**Acute**
B	Arsenic	3 ug/L	0.004 ug/L	**750**	3/10th of the MCL	**Chronic**
B	Nitrate	35	45 mg/L	0.78	1.1 times the MCL	Acute

Consumers in water system A will receive drinking water that contains nitrate at 90 mg/L, which is two times greater that the drinking water MCL, and is a chemical causing potential acute human health issues. Arsenic is not detected above the state DLR in this water system. The overall nitrate toxicity ratio of 2 is very small and will likely contribute minimally to the overall Drinking Water percentile statewide and will not likely rank system A in the higher 10-20 percentile for consideration of priority assistance. In contrast, System B which contains a TWA of arsenic at 3 ug/L or three tenths of the MCL, with a chronic health impact over a life time exposure, and a toxicity ratio of 750 will most likely produce a relative higher Drinking Water percentile score with ranking for potential funding assistance. In reality, the system serving water with a chronic acute chemical, such as nitrate, at three times the drinking water standard, should rank in the upper percentile for priority funding assistance to remediate an acute, potentially serious health exposure (especially for young infants below the age of six months – blue baby syndrome).

- Example 2 – TWA = DLR

Table 1 also illustrates the issues associated with the use of the PHG in the toxicity ratio calculation and assuming the TWA of a contaminant is equivalent to the CDPH detection limit for reporting purposes (DLR). Similar to the findings for the TWA equal to the MCL, the toxicity ratio is skewed to the presence of arsenic and significantly affects the overall weighting in the calculations used to determine the cancer score and overall Drinking Water statewide percentile for each tract. The arsenic toxicity ratio of DLR (2 ug/L) / PHG (0.004 ug/L) is 500, which overshallows or conceals the toxicity ratios of many the other chemicals without considering the acute nature of some indicators such as nitrate, perchlorate, and microbial detections. The driver for higher statewide percentiles appears to be the presence of detectable levels of arsenic less ($\geq 2 \leq 10$ ug/L) regardless of the level of occurrence and relationship to the arsenic MCL of 10 ug/L.

This example also illustrates the issue of the arsenic DLR when retrieving data from the state database (e.g., PICME) and discussed at length at the Metropolitan Water District's workshop held May 15, 2014 following the Member Agency Water Quality Managers meeting. Listed in the above table reveals a significant disparity of how toxicity ratios are calculated from compliance data reported to the state. In general, occurrence levels below the DLR are reported as "zero." However, the CDPH DLR for arsenic is 2 ug/L and as listed in Tables 1 and 2, occurrence levels less than 2 ug/L are reported as zero; however, if a sample is analyzed for arsenic and detected at 2.0 ug/L, just slightly above the DLR, the data exported to the state is 2.0 ug/L following CDPH

reporting protocols. Table 2 shows the substantial difference in the calculated toxicity ratios calculated at zero or increasing to 500 using the PGH. The reported value of 1.9 ug/L relative to 2.0 ug/L are within method analytical quality assurance. However, reporting a toxicity ratio of 500 compared to reporting the level of arsenic that is below the MCL or at 20 percent of the MCL imparts a different "safety of my water message" to the consumer.

Table 2				
Arsenic TWA	**PHG**	**Toxicity Ratio**	**Comparison to MCL**	**Health Impact: Acute or Chronic**
0 ug/L (TWA = 1.9 ug/L)	0.004 ug/L	**0**	**Below DLR**	Chronic
2 ug/L	0.004 ug/L	**500**	**20% MCL**	Chronic
3 ug/L	0.004 ug/L	750	30% MCL	Chronic
4 ug/L	0.004 ug/L	1000	40% MCL	Chronic
5 ug/L	0.004 ug/L	1250	50% MCL	Chronic
8 ug/L	0.004 ug/L	2000	80% MCL	Chronic
10 ug/L	0.004 ug/L	**2500**	**At MCL**	Chronic

- Example 3 – TWA = DLR

The last column of Table 1 assumes that the time-weighted average concentration of each of the listed 19 chemicals is equal to the detection limit for reporting purposes (DLR). The drinking water standard or MCL of each contaminant is used as the metric to calculate the toxicity ratio:

$$\text{Toxicity ratio} = \frac{\text{TWA (set at DLR for each contaminant)}}{\text{MCL (for each contaminant)}}$$

This exercise illustrates that the toxicity ratio, based on the MCL as the metric, produces a ratio that does not relatively overweight some chemicals by orders of magnitude (e.g., six cancer chemical with toxicity ratios greater than 100 by use of PHG calculations). OCWD concurs with the Association of California Water Agencies (ACWA) comment to use the MCL toxicity approach for systems that have been identified as having significant water quality issues and/or providing drinking water that has a contaminant that exceeds the drinking water MCL. The MCL is used by EPA and CDPH to determine compliance of contaminants, is a familiar metric of assessing water quality in numerous communication outreach documents to educate consumers on the quality of their water, and used in the annual CCRs distributed to consumers by their water systems.

OEHHA should consider the outcome of the statewide Drinking Water percentiles using the MCL in the toxicity assessment and evaluating if this approach better identifies communities that have significant water quality issues (e.g., contaminants that exceed the MCL, both acute and chronic chemicals). Other options should be explored that provide an assessment of water quality that is not skewed heavily most notably by the detection of arsenic.

2.0 Technical Issues - Draft CES 2.0 Source Water Quality Data

2.1 Water Quality Data – Accuracy and Quality Assurance

OCWD appreciates the outreach efforts provided by CalEPA and OEHHA staff to respond to water agencies/water district questions to better understand the methodology and calculations used by OEHHA to derive toxicity ratios, cancer and non-cancer scores, and general overview of developing Drinking Water percentiles. The draft CES 2.0 workshop, organized by ACWA following the MWD Member Agency Water Quality Managers meeting on May 15, 2014 held at MWD, provided an excellent forum for informative discussions among the attendees. As noted in comment letters from the water community, there is substantial concern on the databases used (i.e., how the data were selected from PICME, etc.) in the draft CES 2.0 to represent the water quality of delivered water to consumers in each census tract and displayed in color coded maps. Through this open exchange workshop it was discovered that many sources, as defined by the PICME database, were incorrectly used or not used to represent delivered water quality and the CES 2.0 calculations and relative rankings.

A firm understanding of the PICME database and what each PICME sample ID represents is necessary to effectively use the database as source data for the various assessment steps in the CES 2.0 process. Input and guidance from water utilities is a necessity to apply the PICME database information correctly to accurately represent the water quality distributed by each water system. Water utility input is vital to selecting appropriate data to use in the CES 2.0 assessment steps due to the system complexities to "deliver water" that includes not only seasonal demand, system hydraulics, treated/blended water, active and inactive sources, groundwater and imported purchased water. It is highly recommended that coordination and input with water systems be pursued as a key component to address quality assurance with the Drinking Water Indicator (DWI). Given the timelines projected to finalize the CES 2.0, it is highly recommended that the DWI be removed from the final CES 2.0 based on issues related to quality assurance and ensuring water quality scores and percentiles are accurately calculated for each water system. It is best to delay inclusion of the DWI rather than use data of uncertain quality, producing uncertain findings, and potentially sending confusing messages to the public and regulators on the quality of water served to respective tracts (e.g., CCR versus CES 2.0 findings). The example census tract discussed in Section 2.2 provides support for these recommendations to delay the inclusion of the DWI in CES 2.0.

2.2 Example Census Tract – Westminster

At the MWD May 15 workshop, CalEPA and OEHHA provided an example census tract located in Westminster to aid in explaining the various source databases and water quality data used to generate the cancer and non-cancer scores that ultimately were used to generate a statewide Drinking Water percentile. This census tract appeared in a Los Angeles Times article published April 22, 2014, which prompted consumer and city inquires about their water quality and extent of "water contamination." The colored coded map of toxicity-weighted drinking water quality index displayed in the media release resulted in significant time spent in public relations damage control and extensive investigation by representatives from OCWD, City of Westminster, and OEHHA. OCWD commends the willingness, promptness and openness of OEHHA staff

to provide specific Westminster census tract raw data to aid in developing responses to the consumer, city staff and council members.

Listed below is a summary of the review of the raw data used for the Westminster census tract to produce the toxicity-weighted drinking water quality index to illustrate that improvements are needed in the draft CES 2.0 methodology to (1) ensure that the quality of data used to produce revised CES 2.0 maps and Drinking Water percentiles are accurate and (2) represent the actual water quality of water delivered and consumed by the population served in the respective census tracts as benchmarked to the MCL.

- Four sources were identified to provide water to the Westminster tract: City of Westminster and three small system wells;
- For this tract's assessment, 50 percent of the city's sources were allocated to MWD imported water and 50 percent from the City's groundwater wells;
- The Westminster tract has a population of 6,069 and the portion of the tract that receives the City of Westminster's groundwater and imported water has a population of 3,316, representing 54.6% of the total population in this tract; the remaining 45.4% of the population receives water from two small system wells;
- One small system with one well is located in another city and the well was destroyed in 2011. The small system was incorrectly located in Westminster and included well data for arsenic, nitrate and uranium data to contribute to the overall tract's cancer and non-cancer scores;
- One small system well data for arsenic and uranium were used to contribute to the overall tract's cancer scores;
- One small system well data for arsenic and hexavalent chromium were used to contribute to the overall tract's cancer scores;
- All of Westminster's ten groundwater well's source data for the 19 chemicals were not included;
- For Westminster's THMs occurrence, the Stage 2 distribution data were used (eight locations);
- THMs data from multiple MWD imported purchase data were also used;
- No MWD imported source data for the 18 chemicals were included; and
- The high cancer score for this tract is primarily driven by the arsenic values from the three small system wells.

3.0 Contaminants Used to Represent Overall System Water Quality and Calculating Drinking Water Percentiles

OCWD recommends deletion of three chemicals from the twenty water quality contaminants used in the draft CES 2.0 process to calculate toxicity ratios, cancer and non-cancer scores, DW statewide percentiles and relative rankings:

- Total trihalomethanes (THMs) is included in the cancer causing chemical category and should be excluded because there is no final PHG developed for the THMs. The draft THMs PHG was issued 6/19/2009 and revised in 9/9/2010. The draft CES 2.0 DWI is defined as a toxicity-weighted drinking water quality index based on the calculation using a chemical contaminant's PHG. Only adopted PHG should be used in the draft CES 2.0 process. It is

inappropriate to use proposed PHGs in this process that has significant outcomes regarding priority funding and producing metrics describing water quality of delivered water to consumers. The methodology selected to develop toxicity-based DWI scores must be consistent for all chemicals.

- Lead is included in the non-cancer causing chemical category and should be excluded because of the uncertainty in the source of data used to calculate the DWI metrics. Lead source testing (i.e., drinking water wells or imported purchased water) is no longer required by EPA or CDPH. The Lead and Copper rule requires lead and copper testing at selected consumer taps located within a resident. The lead data is site specific, there is no MCL but an Action Level that triggers treatment technique and other investigative/corrective steps (i.e., optimize corrosion control, lead replacement lines [not in houses], source water monitoring program, public education, etc.). The lead and copper reporting requirements are unique to the regulation and do not require data storage in the PICME database. However, some lead (and copper) data may be reported at sources and exported to the PICME database through reporting of other regulated trace metal compliance testing. It is unclear "what lead data" was used in the draft CES 2.0 and source of data. The dataset used may represent a very small percent of the reporting statewide systems.

- Total Coliform Rule (TCR) violations is included in the non-cancer causing category and should be excluded because (1) it does not meet the DWI methodology described in the draft CES 2.0 and the DW Quality Indicator Supporting Documentation to use the TWA of a chemical contaminant divided by its PHG or a justification and basis of why the indicator should be included outside of the DWI methodology, (2) there is no justification or detailed description on how the 1.5 multiplier was derived, and (3) the TCR will be replaced in the near future with a revised microbial regulation that will use *E. coli* as the indicator of microbial water quality and dropping the total coliform metric.

4.0 Additional Comments on draft CES 2.0 and Available Data

4.1 Occurrence Data – Groundwater Sources

The compliance monitoring frequencies for groundwater and surface water sources are determined by EPA's Standardized Monitoring Framework. In general, for trace metals the compliance monitoring period is once every three years for groundwater sources and quarterly for surface water sources. Therefore, the occurrence data for groundwater source may appear to be missing in the PICME database used for the draft CES 2.0 assessments. It is recommended that the methodology used to calculate cancer and non-cancer scores assess the compliance monitoring requirements and apply to calculate TWA.

4.2 Drinking Water Quality Indicator Supporting Documentation

OCWD recommends that comprehensive and detailed examples be included in the Drinking Water Quality Indicator Supporting Documentation. The document should

include a detailed explanation on how each DWI metric is calculated by using an example tract or tracts that includes multiple sources and multiple detections of both cancer and non-cancer causing chemicals. The draft supporting documentation provides many of these steps but excludes the calculation of the individual tract percentiles based on the statewide percentiles of all tracts. Each step in the process should be clearly presented showing sources of data, how cancer and non-cancer scores are calculated, TWA, etc. ultimately leading to the final DW percentile.

5.0 Conclusions and Recommendations

OCWD acknowledges the openness and commitment of representaties from CalEPA and OEHHA to share information quickly and respond expeditiously to water community inquiries. The outreach effort following notice of the release of the draft CES 2.0 has been greatly apreciated. OCWD concurs with ACWA's findings and comments on the draft CES 2.0 and recommends the following:

- Delay inclusion of the Drinking Water Indicator in the final CES 2.0 until
  - technical issues have been addressed;
  - input by water utilities have been coordinated; and
  - quality assurance with datasets are confirmed.
- Do not use PHG in the toxicity ratio calculation
- Consider and assess using the MCL in the toxicity ratio calculation. The MCL is the standard metric for assessing compliance with drinking water standards nationwide.

OCWD appreciates the opportunity to provide comments the draft CES 2.0 tool to use high quality data that is reliable, accurate and represents the water quality provided by water utilities. If you have any questions, or need additional information, please contact me at (714) 378-3281 or nyamachika@ocwd.com or Mike Wehner, Assistant General Manager at (714) 378-3297 or mwehener@ocwd.com.

Very truly yours,

Nira Yamachika

Nira Yamachika
Director of Water Quality

cc: The Honorable George Alexeeff
Dr. Gina Solomon
Ms. Laura August