# City of Santa Barbara

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Jeanine Townsend
Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814



Subject: City of Santa Barbara Comments on Draft Report to the Legislature on the Feasibility of Developing Uniform Water Recycling Criteria for Direct Potable Reuse

Dear Ms. Townsend:

The City of Santa Barbara (City) is currently evaluating the feasibility of indirect and direct potable reuse (IPR and DPR) as potential long-term water supply options. The purpose of this letter is to provide the State of California Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) comments on the draft report titled "*Investigation on the Feasibility of Developing Uniform Water Recycling Criteria for Direct Potable Reuse*" (hereafter, "Draft Report") that was issued pursuant to requirements set forth in Senate Bill (SB) 918. Because the City has not yet arrived at a decision to carry through with a potable reuse supply project, the City's comments are directed toward possible potable reuse applications in general. Of particular concern is Chapter 5 (Implementation Plan) of the Draft Report, which provides little guidance on the path forward for developing uniform water recycling criteria for direct potable reuse. The City requests that the Implementation Plan includes a commitment for addressing the recommendations in the Draft Report, with a timeline for completion and adoption of uniform water recycling criteria.

For context, a summary of the City's understanding of the Draft Report is provided below, and the City's comments are emphasized in *italics* herein.

## Summary & General Comments

The Draft Report states that it is feasible to develop uniform water recycling criteria for DPR. The criteria would incorporate a level of public health protection as good as or better than what is currently provided in California by conventional drinking water supplies, IPR systems using groundwater replenishment, and proposed IPR projects using surface water augmentation.

In general, the Draft Report found that regulations for DPR projects are attainable and that a common framework across the various types of DPR will help avoid discontinuities in the risk assessment and management approach. However, additional information is needed to develop criteria to allow for an objective compliance determination to be made. The Draft Report states that the process for developing criteria for DPR can be initiated as projects move forward, with a parallel analysis of the knowledge gaps.

The Draft Report outlines recommendations that must be addressed to successfully adopt uniform water recycling criteria for DPR that are protective of public health. The recommendations, which are documented in Chapter 4 and summarized in Table 1 of the Draft Report (SWRCB, 2016), are transcribed as follows:

1. Convene a "blue ribbon" panel to review scientific literature and report on the current state of scientific knowledge regarding the risks of emerging contaminants to public health.

2. Consider the use of probabilistic quantitative microbial risk assessment (QMRA) to evaluate the performance and reliability of DPR treatment.

3. Work with the Regional Water Quality Control Boards to include monitoring for pathogens in raw wastewater feeding potable reuse systems, and work with local health departments and wastewater agencies to investigate the feasibility of collecting pathogen concentration data in raw wastewater associated with community outbreaks of disease.

4. Conduct short term research on options for final treatment processes that can provide some attenuation with respect to potential chemical peaks.

5. Develop more comprehensive analytical methods to identify low molecular weight unknown contaminants.

6. Convene technical workgroups to address the knowledge gaps regarding resiliency to assist in developing uniform water recycling criteria for DPR.

The Expert Panel and Advisory Group's recommendations for non-treatment barriers were adopted in the Draft Report, including:

1. Training and certification of operators for potable reuse treatment facilities

2. Optimizing wastewater treatment plant (WWTP) performance to prepare for DPR

3. Enhancing source control programs designed to prevent or minimize discharges of toxic chemicals to sewer systems that feed into DPR treatment plants.

4. Ensuring agencies implementing DPR projects have adequate technical, managerial, and financial capacity to ensure the success and safety of the project.

*The City acknowledges that these findings and recommendations generally follow current industry best practices and critical considerations for DPR. A few specific points warrant further discussion, particularly in terms of how they can impact DPR projects in California, which are either currently being considered, or could be developed in the future.*

**Specific Findings & Comments**

The SWRCB makes several statements in the Draft Report that could have implications to the path forward for DPR projects in California and the City:

- **Timing.** The SWRCB plans to further address knowledge gaps related to reliability prior to finalizing uniform water recycling criteria for DPR. This indicates that any planned DPR projects may need to be brought before the Board for site-specific approval in the absence of a State-wide framework.

    - *In the absence of uniform criteria, the schedule and cost for developing a reuse supply is difficult to predict, making it difficult for the City and other agencies to further investigate studies for alternatives, project concepts and designs without knowing if these technologies and processes would be approved.*

- **Framework for criteria.** The Draft Report indicates each type of DPR project will have its own unique set of criteria that are possibly captured within a common framework to avoid discontinuities in the risk assessment. Thus, how a DPR project is defined could have implications to permitting requirements.

    - *The City requests clarification on how a DPR project is defined and the types of criteria that may apply In particular, the line is blurry between the first two types of DPR projects listed on p. 18 of the Draft Report. Specifically:*

        - *1) A project delivering recycled water to a surface water reservoir, with the reservoir providing some benefit, but not the full complement of benefits provided by IPR with surface water augmentation.*

        - *2) A project delivering recycled water directly to a surface water reservoir, with the reservoir providing no benefits.*

      *The SWRCB defines the third type of DPR as "a project delivering finished water [directly] to a public water system's distribution system."*

- **Raw water pathogen monitoring, including during outbreaks and recommendation to consider incorporating QMRA.** The SWRCB approach in the Draft Report on establishing pathogen log inactivation / removal requirements will directly impact treatment requirements and costs. The language in the Draft Report suggests that rather than setting uniform values as with the groundwater replenishment requirements (Table 1), the log inactivation / removal requirements could be based on site-specific raw water pathogen concentrations, or a more robust set of raw water pathogen concentrations for California that encompasses outbreak data. Those site-specific or worst case raw water pathogen data would be used to calculate the required log removal / inactivation requirements to achieve a target finished water quality, potentially derived from QMRA.

    - *The City acknowledges and supports this draft language. Our understanding is that depending on the database of raw water pathogen data, this approach could result in similar or more stringent requirements for log inactivation / removal than those established for IPR using injection into the groundwater aquifer as an environmental buffer.*

- **Monitoring and control of ongoing projects.** The Expert Panel suggests that a new formal process be established by the SWRCB to administer periodic review of treatment performance data of permitted potable reuse projects. This proposed process is not unlike the process for ongoing monitoring and review of surface water treatment plant

(WTP) operation through surface water monthly operating reports (SWMORs), annual reports (e.g., Consumer Confidence Reports), and California DDW inspections. The SWRCB also indicates a plan should be put in place to review every five years the chemicals of emerging concerns and related science.

- *The City acknowledges that protection of public health is the greatest priority and supports this draft language. Our understanding is that the activities above could have implications on permitted operation of a DPR facility, but with the benefit of providing a mechanism for continued review of whether a specific DPR facility, or DPR in general is providing the best feasible level of protection of public health.*

- **Start-up and commissioning.** The Expert Panel cautioned that the introduction of DPR water into a public water system be staged to demonstrate reliability before contribution is increased.

  - *This language, if adopted by the SWRCB, has potential implications on the approach for starting up new DPR facilities, which in turn would result in cost and schedule implications.*

- **Approach to fill knowledge gaps and incorporate new research findings.** In the Draft Report, the SWRCB recognizes the need to consider recently completed and ongoing research through its plan to convene a blue ribbon panel and technical workgroups focused on further developing quantitative metrics and criteria that address the concept of reliability.

  - *Outcomes of ongoing research and those panel discussions will influence the criteria for DPR. The outcomes should be carefully tracked by any ongoing planned DPR project to make sure the facility design reflects any updated requirements that could be incorporated in the uniform water recycling criteria for DPR, based on emerging science.*

- **DPR projects without reverse osmosis (RO) treatment.** The Expert Panel recommended that the SWRCB consider proposals for DPR projects that do not use RO. While RO provides a robust barrier for protozoa, viruses, nitrate, nitrite, TDS, and multiple metals and chemical micro-constituents, it produces a concentrate stream of approximately 20% or more of the raw water production rate that requires disposal with environmental implications.

  *Considering the concern over contaminants concentrated in RO brine, non-RO alternatives should be considered for DPR. To facilitate this, the uniform water recycling criteria will need to be written in a manner that allows for consideration of non-RO alternatives.* The SWRCB highlights that "…there should be some specific reliability criteria for alternatives." *SWRCB's approach to establishing criteria for non-RO alternatives will have significant ramifications for the design and cost of DPR projects implementing non-RO alternatives.*

  - *The City's feasibility study has received public comment expressing concern over contaminants in RO brine. The Draft language should allow for alternatives to the RO treatment processes.*

- **Provision of a final treatment step to "average" out any chemical peaks.** The Expert Panel's recommendation for research to identify suitable options for final treatment processes that can provide some "averaging" with respect to chemical peaks.

  *Any resulting language that is incorporated into the final criteria will have important implications to the design, cost, and operation of DPR projects. This point should be carefully considered:*

  - *If the Expert Panel is concerned with chemicals that pose a chronic health impacts, "averaging" may or may not result in a health benefit.*
  - *Large storage volumes following chlorine disinfection can result in a risk tradeoff of increased formation of halogenated disinfection by-products (DBPs).*
  - *Alternate approaches to "averaging" can result in the same desired benefit. For example, if the motivation for "averaging" is to reduce peak concentrations in organic chemical concentrations, a granular activated carbon (GAC) or biologically-active carbon (BAC or BAF) polishing step can further reduce concentrations of these chemicals, rather than simply "averaging." If the motivation for "averaging" is in part to provide additional time to detect and respond to off-specification water, Salveson et al. (2016) outlines several recommended approaches to provide that engineered buffer.*

- **Consideration and incorporation of non-treatment barriers.** The Expert Panel and the SWRCB recommend in their Draft Report incorporation of non-treatment barriers, including: optimization of WWTP, source control, technical, managerial, and financial capacity (TMF), and operator training and certification.

  *The SWRCB approach to incorporating these non-treatment barriers in any uniform water recycling criteria for DPR could have implications to:*

  - *WWTP capital improvement projects (CIP), operational costs.*
  - *Pre-treatment program requirements for monitoring, management, and local limits.*
  - *Industrial discharge options and costs.*
  - *Water utility investment in technical, managerial, and financial capacity.*
  - *Staffing and training costs for operation of a new DPR facility.*

  *The City acknowledges that generally, these non-treatment factors reflect best practices for DPR and are recommended within the potable reuse industry. However, their potential adoption within criteria for DPR projects highlights the importance of planning in advance to ensure that they are addressed as part of a comprehensive DPR project requiring State of California approval.*

- **Research on low molecular weight organics**. One of the SWRCB recommendations in the Draft Report is that research be conducted to develop more comprehensive

methods to identify low molecular weight unknown compounds for DPR, including non-targeted analysis as a screening tool.

*How the SWRCB proceeds with this may impact monitoring requirements at a minimum for DPR projects, but could also affect treatment requirements and incorporation of processes that address low molecular weight compounds. Low molecular weight compounds are perhaps the most challenging to remove through established treatment processes (e.g., membrane filtration, RO, advanced oxidation, GAC adsorption, BAF, and chemical disinfection). Requirements to mitigate these compounds could include source control strategies as one of the more impactful approaches to reduce concentrations in DPR projects.*

**Implementation Plan**

Chapter 5 of the Draft Report acknowledges that the State Board can start developing criteria for DPR, but outlines implementation recommendations that must be addressed before criteria for DPR can be adopted.

*The City understands that once the subject report on the feasibility for developing direct potable reuse criteria is complete, the SWRCB will have met its obligation with respect to direct potable reuse under CA Water Code 13560-13569. The City is concerned that there is not a clear process to move forward with recommended actions in the Draft Report, and subsequent adoption of criteria for DPR. Without uniform recycling criteria, it is difficult for the City to assess the cost, schedule, and implementation factors for a future potable reuse project. The City has a goal of updating its Long Term Water Supply Plan before 2020, and would like to evaluate direct potable reuse as a realistic water supply option that could be implemented within a 20 year planning horizon.*

*The City is encouraged that the Draft Report found development of uniform DPR criteria to be feasible, and urges the State to expand its implementation plan and provide a clear commitment, with deadlines, to complete the recommended actions and subsequent adoption of the criteria. Without such a clear commitment from the State for developing uniform DPR criteria, the City may consider DPR too high of a risk of being an unviable option, and will feel forced to pursue other alternative water supply.*

We sincerely appreciate the opportunity to provide comments on the Draft Report. Please do not hesitate to contact us with any questions.

Sincerely,

CITY OF SANTA BARBARA

Joshua Haggmark, P.E.
Water Resources Manager

KD:EC