

Memorandum

Date: October 1, 2010

To: Ms. Kathy Harder
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, Ste 200
Rancho Cordova, California 95670-6114

From: Gerald E. Johns
Department of Water Resources

Subject: Comments on the Sacramento Regional County Sanitation District's tentative National Pollutant Discharge Elimination System Permit Renewal for the Sacramento Regional Wastewater Treatment Plant.

The Department of Water Resources (DWR) strongly supports the tentative permit prepared by the Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff for the Sacramento Regional County Sanitation District's (SRCSD) discharge on the Sacramento River and the Delta. We encourage the Central Valley Water Board to adopt this permit.

DWR appreciates the opportunity to provide comments on the Central Valley Water Board's tentative National Pollutant Discharge Elimination System (NPDES) permit renewal process for the SRCSD Wastewater Treatment Plant. This letter augments our comments submitted February 4, 2010, regarding potential drinking water supply and public health impacts and the May 18, 2010 comments regarding aquatic life and wildlife preservation associated with SRCSD's previously proposed expansion and relicensing. As indicated in the Central Valley Water Board's tentative permit, the Delta is a source of drinking water for more than 25 million Californians and is one of the most ecologically important aquatic habitats in the State. DWR is the state's primary water resources management agency and has an inherent interest in ensuring that Sacramento River and Delta water supplies are of sufficient quality to protect the aquatic life and suitable for the production of a safe and reliable drinking water supply.

Primary drinking water constituents of concern associated with the SRCSD discharge include, but are not limited to, organic carbon, nutrients, pathogens, taste and odor producing compounds, and nitrosamines and their pre-cursors. Control of nutrients, oxygen demand, and toxic contaminants is also a major consideration for the protection of ecosystem function. The tentative permit represents a positive step toward assessing and reducing the potential adverse effects of SRCSD's discharge on the Sacramento River and the Delta. As drafted, the tentative order would provide significant direct and indirect benefits to water quality in the Sacramento River and Delta. DWR supports and appreciates the Central Valley Water Board staff efforts in incorporating best available science into the development of the tentative order. Accordingly, we strongly support adoption of Water Quality Based Effluent Limits and implementation of Best Practical Treatment Controls in the form of

nitrification/de-nitrification and Title 22 (or equivalent) tertiary filtration. We also support inclusion of expanded monitoring requirements, special studies, and reopener provisions to allow for modification of the SRCSD permit if new information becomes available.

Below are specific comments and recommendations pertaining to the protection of the municipal and aquatic life beneficial uses of the Sacramento River and Delta.

Specific Comments

Organic Carbon

Discharge of organic carbon to the Delta is a concern because of the potential for formation of disinfection byproducts (DBPs), such as haloacetic acids (HAAs) and trihalomethanes (THMs), when source waters are disinfected with chlorine or ozone. HAAs have the potential to increase the risk of cancer, and THMs may cause liver, kidney, or central nervous system problems and also increase the risk of cancer (USEPA, 2010). Organic carbon, along with the pathogens *Cryptosporidium* and *Giardia*, were recently identified by the Central Valley Water Board as the focus for consideration in the development of a regional drinking water policy (CVRWQCB Resolution No. R5-2010-0079). Organic carbon concentrations in the Sacramento River downstream of the SRCSD discharge are relatively low with a median total organic carbon concentration of 2.1 mg/L at Hood for the period covering Water Years 2004-2009 (DWR, 2010). Dissolved organic carbon concentrations, however, have shown an increasing trend in the Sacramento River at Hood during the 10-year period running from 1999-2008 (DWR, 2010b). Additionally, the SRCSD's total organic carbon effluent concentration was more than eight times higher than ambient Sacramento River levels with a median effluent concentration of 17 mg/L (CVRWQCB, 2009).

Reopener Provision G

Given the potential for SRCSD's discharge to increase ambient organic carbon concentrations in the Sacramento River we support inclusion of Reopener Provision G (see tentative order, p. 24) and monitoring requirements for organic carbon in the permit. DWR operates four water quality monitoring stations in the Delta where we measure organic carbon on a near real-time basis. Based on our experience, monthly sampling is not always sufficient to capture natural variability. We therefore recommend that the monitoring frequency be increased from monthly to daily to better capture the variability of the discharge, especially during the winter storm season when the plant receives a considerable volume of urban runoff. To accommodate a broader range of

potential outcomes from the Regional Board's future drinking water policy¹ we suggest rewording Reopener Provision G. As written, Reopener Provision G would only take effect if the Regional Board adopts water quality objectives for certain drinking water constituents, but a drinking water policy could lead to other actions that would necessitate reopening the permit.

NDMA

Nitrosodimethylamine (NDMA) is a member of a chemical family known as nitrosamines which are several orders of magnitude more toxic than currently regulated DBPs (i.e., THMs, HAAs). NDMA and five other nitrosamines are on the current EPA Contaminant Candidate List and are currently being monitored by selected public water systems under EPA's Unregulated Contaminant Monitoring Regulation 2, a process which identifies whether a contaminant has the potential to harm human health and if regulation would reduce public health risks. NDMA is commonly found in treated wastewater as a chlorine byproduct.

Ammonium and Nutrients

Elevated levels of ammonium and dissolved organic nitrogen in receiving waters can lead to the formation of Nitrosamines during the treatment of drinking water. Over the last year and a half, water quality monitoring downstream of SRCSD's discharge has detected elevated levels of precursors associated with NDMA. Therefore, we support inclusion of the monitoring requirements and effluent limits for NDMA that are contained in the tentative order. Additionally, we believe that the proposed requirements for nitrification/denitrification will reduce the potential for nitrosamine formation during the disinfection at the wastewater treatment plant and during the drinking water treatment process.

Nutrients, and ammonium, in particular, have elevated importance in the drinking water, ecosystem, and regulatory environment. From a drinking water perspective, increased nutrient loading can lead to eutrophication of source waters, which in turn can lead to increased levels of organic carbon, objectionable taste and odor producing compounds (i.e., Geosmin and 2-Methylisoborneol [MIB]), and toxic microcystins. Data and information provided by the Central Valley Water Board suggests that the current SRCSD discharge is already causing concentrations of phosphorus and nitrogen in the Sacramento River to exceed levels recommended by the USEPA to prevent eutrophication, which are 0.055 mg/L for total phosphorus and 0.66 mg/L for total nitrogen (CVRWQCB, 2009). Recent data collected by DWR also suggests that the SRCSD discharge results in significant increases in nutrient concentrations in the Sacramento River. For example, median total

¹ Central Valley Regional Water Quality Control Board Resolution No. R5-2010-0079 expresses a commitment to developing a comprehensive drinking water policy for the Delta and tributaries and directs their staff to develop a policy for consideration by the Board by July of 2013.

phosphorus and total nitrogen concentrations downstream of the SRCSD discharge at Hood were 0.10 and 0.77 mg/L respectively for water years 2007-2009 (DWR, 2010). Ammonium accounted for approximately half of the total nitrogen in the Sacramento River at Hood and was more than ten times the levels recorded at three sites upstream of the SRCSD discharge. When nutrient enriched waters enter the State Water Project (SWP), the eutrophication effect can be amplified as hydraulic residence time increases. We therefore support requirements for nitrification/denitrification as proposed in the tentative order and DWR continues to support ongoing and future ammonia studies and the use of *Hyalella azteca* and rainbow trout as test species.

Fish Passage issues

DWR supports the United States Fish and Wildlife Service (USFWS) request to characterize fish response to the discharge field and predator concentrations. We also recommend that additional fish tracking studies be required to validate the SRCSD's anti-degradation analysis paper's assumption that fish passage is not restricted and fish will maneuver around rather than travel through the discharge and mixing zone plume. Additionally, we recommend high frequency discrete or continuous monitoring of water quality parameters in the outfall area to validate plume dispersion. Both federal and State guidelines state that mixing zones shall not restrict the passage of aquatic life. The SRCSD proposed NPDES requirement would allow for a thermal mixing zone which would be 50 percent of the cross-sectional area of the river, and evaluated as a daily average. Under this requirement, plume scenarios may occur where passage of aquatic life is in fact restricted. Accordingly, we support the more stringent requirements contained in the tentative order which limit the thermal mixing zone to 25 percent of the cross sectional area of the river.

Unknown Contaminates

Unknown contaminants in the SRCSD discharge is an issue of ongoing concern. The SRCSD's compliance summary shows no acute toxicity in 2005, 2006, and 2007, then the occurrence increases to six acute events in 2008 and nine in 2009. Studies conducted with delta smelt at the University of California at Davis Aquatic Toxicology Laboratory (UCD ATL) demonstrated that ammonium associated with SRCSD effluent was 30-40% more toxic to larval smelt than ammonium by itself and research elsewhere has demonstrated that mixtures of ammonium and other chemical pollutants, such as copper, cyanide, phenol, zinc, and chlorine (with the formation of inorganic chloramines), may result in additive toxicity or even cause synergistic effects (Camargo and Alonso 2006). Additionally, the unknown contaminants in addition to unionized ammonia may have contributed to the low survival of the copepod species *Eurytemora affinis* in tests conducted by Dr. Teh of UC Davis in April 2008, with water samples collected from the DWR water quality monitoring station at Hood on the Sacramento River (Teh 2008). Given the potential implications for the pelagic organism decline, we recommend these issues be further evaluated.

The tentative order includes several important requirements that could improve aquatic life and other beneficial uses. These include full nitrification for removal of ammonia, denitrification, and the equivalent to Title 22 filtration. Concerning dilution alternatives, the tentative order includes an acute toxicity effluent limitation determined by acute bioassays using 100% effluent and requires the discharger to investigate the causes of and to identify corrective actions to reduce or eliminate effluent toxicity. Due to the "unknown" contaminants in the effluent and the research mentioned previously, we support this action. In addition, we continue to recommend studies be conducted to characterize the temperature effects on migrating fish, especially in the relation to being exposed to elevated ammonium and other contaminants.

While contaminants of emerging concern (CECs), including pharmaceuticals and personal care products (PPCP's) are not currently regulated, additional studies could provide information about expression of PPCP exposure in whole effluent to species of concern. To this end, the Central Valley Water Board should consider incorporating permit conditions requiring monitoring and special studies related to the effects CEC's on aquatic life.

Pathogens

Evaluation and control of pathogens, in particular Cryptosporidium and Giardia, is an issue of increasing focus and concern for SWP drinking water contractors. The tentative order prescribes Title 22 (or equivalent) tertiary filtration for the control of pathogens. We recognize that this level of treatment is primarily required for the protection of the agricultural and recreational beneficial uses; we note however, that tertiary filtration has the added benefit of reducing risks associated with pathogens in drinking water supplies. Advanced filtration should also reduce total organic carbon loading. We also note that tertiary treatment appears to be reasonably common for wastewater treatment plants that discharge to the Delta (see Appendix F of the tentative order, p. F-75). For these reasons DWR supports the imposition of Title 22 (or equivalent) tertiary filtration requirements in SRCSD's NPDES permit as well as the proposed monthly monitoring requirements for Cryptosporidium and Giardia. We recommend, however, that the monitoring requirements be revised to require analysis of infectivity for Giardia and genotyping for Cryptosporidium and Giardia. This would provide information on the sources of Cryptosporidium and Giardia and the effectiveness of treatment, which ultimately could lead to better and/or more cost effective control.

Protection of high quality waters

Major drinking water intake facilities are located both downstream and immediately upstream of the SRCSD discharge point. Upstream drinking water intakes could potentially be affected by SRCSD's discharge when low river flows coincide with high tides and the direction of flow in the Sacramento is reversed. The proposed permit conditions should protect drinking water quality at existing drinking water intakes, but it is also incumbent upon the Central

Valley Water Board to consider the State Water Resources Control Board's (State Water Board) "Sources of Drinking Water Policy" (Resolution 88-63), as incorporated into the Central Valley Water Board's Basin Plan. The Sources of Drinking Water Policy effectively designates the entire Sacramento River as having municipal and domestic supply beneficial uses. Additionally, the State Water Board's Statement of Policy with Respect to Maintaining High Quality Waters in California (anti-degradation policy/Resolution 68-16) requires that existing high quality waters be maintained to the maximum extent possible. Collectively these policies require the Central Valley Water Board to protect and maintain the domestic and municipal beneficial of water in the immediate vicinity of SRCSD's discharge point as well as at downstream locations. The tentative permit, with the revisions recommended herein, will likely satisfy these stringent requirements and go a long way towards the overall protection of the municipal and aquatic life beneficial uses of the Sacramento River and Delta.

Higher treatment instead of reliance on dilution

Determining possible future dilution flows is speculative and cannot be relied upon to protect beneficial uses. When historical records are used as an indicator of future flows the longest available data set should be used. The use of U.S. Geological Survey gauge flow data from 1942-1989 may reduce the probability of a flow less than or equal to 10,000 cfs by removing multiple back to back low flow years in the early nineties. Using only the years 1970-2009 to develop critical low flow values may not be fully representative due to the use of the criteria of lowest daily, and seven day average, flow with a return frequency of 10 years. The use of matching time periods in addition to full historical records when calculating daily flow probabilities and critical flows may be more appropriate.

Current and near future changes in flow volumes and patterns need to be addressed in setting permit limits. With the recent construction of the Freeport diversion, existing Vernalis Adaptive Management Program export restrictions, restrictions included in the recent Biological Opinions, and likely flow changes due to the effects of climate change, historic calculations of assimilation capacity may no longer be valid. Change analysis of Sacramento River flows under these new regimes needs to be analyzed by the SRCSD and changes of assimilative capacity presented to the Central Valley Water Board and stakeholders for assessment of current permit capacity. Future scenarios as detailed in the draft Bay-Delta Conservation Plan, as well as the Woodland/Davis Joint Powers Authority proposal for a Sacramento intake, point to a future where dilution capacity of the Sacramento River below Freeport may be severely limited, or temporally different. This only strengthens the argument of enhanced treatment requirements minimizing release of contaminants and nutrients at any flow rate. The burden of protecting the water quality falls on SRCSD, not on water supplies provided for beneficial uses.

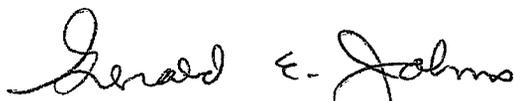
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Conclusion

In summary, existing and ongoing research already suggest that the current loading from waste water treatment facilities to the Delta may already be adversely affecting municipal water supplies and aquatic life directly and through food web interactions. There is a significant body of scientific evidence to support a reduction in nutrient and effluent loading to the Delta. We therefore support adoption of the proposed permit requirements contained in the Central Valley Water Board's tentative order.

DWR appreciates the Central Valley Water Board staff efforts in preparing the tentative NPDES permit and the many challenges associated with assessing these important issues. Please feel free to contact Dean Messer, Chief of Environmental Services, DWR, at (916) 376-9700 if you have any questions regarding these comments.

Sincerely,



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Attachments: See attached References

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