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BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

HEARING ON THE MATTER OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND UNITED STATES BUREAU OF RECLAMATION REQUEST FOR A CHANGE IN POINT OF DIVERSION FOR CALIFORNIA WATER FIX.	**SUR-REBUTTAL TESTIMONY OF ROBERT GRANBERG**

This testimony is offered on behalf of the City of Stockton ("City" or "Stockton").

I. INTRODUCTION

My testimony will rebut the testimony and report of Dr. Michael Bryan (DWR-81 and DWR-652) and show that Department of Water Resources (DWR) and U.S. Bureau

of Reclamation (collectively referred to as "Petitioners") have not proven that the California WaterFix Project ("WaterFix" or "Project") will not injure Stockton as a legal user of water. Dr. Bryan's testimony and report fail to address water quality changes that affect the City's ability to divert water under its Water Right Permit No. 21176, and the City's ability to treat the water to meet all applicable regulatory standards with current technology, as is the current practice and has been since 2012. Thus, the Project will at times render the water unusable for its purpose of use as municipal and industrial supply. Specifically, Dr. Bryan's testimony and report fail to address Project-related changes in water quality on the time scale relevant to the City's use of water; his presentation of data in the form of long-term monthly averages masks substantial increases in various constituents that will render the City's water right unusable in light of the City's unique circumstances, which include its drinking water treatment facility, distribution system, wastewater discharge constraints, and customer base.

The City's Delta Water Supply Project Water Treatment Plant (DWSPWTP) was designed and constructed based on historical and predicted flows and water quality of the Delta, and the fact that the drinking water intake is highly influenced by water originating in the Sacramento River system. Dr. Bryan acknowledges in his report that under the Project, the source water at the City's intake will be altered from that which existed at the time the City acquired its surface water right, with the result that the City's intake will experience a higher proportion of San Joaquin River water quality that is known to be of a lower quality than the Sacramento River. (DWR-652, p. 38)

The City planned, designed, and implemented the DWSPWTP and its San Joaquin River intake as a conjunctive use facility with three (3) main objectives; namely, to 1) promote regional self-sufficiency by replacing declining surface water supplies, 2) protect groundwater resources in a critically overdrafted groundwater basin, and 3) supply future planned growth in the Stockton Metropolitan Area. The DWSPWTP water right (Water Right Permit No. 21176, STKN-014) is based on the City's treated wastewater discharge into the San Joaquin River under a National Pollution Discharge

Elimination System (NPDES) permit issued by the Central Valley Regional Water Quality Control Board. The permit specifies that the City may re-divert the volume of wastewater discharged by Stockton for indirect potable reuse. However, the City cannot take advantage of indirect potable reuse if it cannot use its water right to divert from the Delta.

Stockton's DWSPWTP water right is a critical water source that solves many of the City's issues with previous supply sources. Continued protection of Delta water quality is of utmost importance to the City for its ability to divert, treat and deliver drinking water that meets all regulatory requirements and is of high aesthetic quality for its customers. Reliance on high quality Delta water is no less important to the City than it is to the municipal and industrial users of water exported from the Delta. The Project jeopardizes this critical surface water supply and erodes the City's ability to adequately meet current water supply demand, to meet current and future water quality regulations, and to provide its customers a potable water supply that drives a solid economic base for the region and the State of California. Dr. Bryan's testimony and report inaccurately describes the impacts on water quality to Stockton.

II. INJURY TO STOCKTON DUE TO THE WATERFIX

a. Chloride and Specific Conductance

Chloride and specific conductance (SC),[1] measures of salinity in the Delta, are of concern for the City's drinking water intake and wastewater discharge as it relates to levels and trends under Project operations. In offering his opinion that Project-related changes in chloride and specific conductance at the City's intake will not result in adverse impacts to the municipal beneficial use (MUN), Dr. Bryan relies on a 250 mg/L chloride threshold, which is a secondary drinking water standard level deemed acceptable to consumers. (DWR-652, p. 21.) However, when the chloride concentration rises past 110 mg/L Stockton will incur significant injury in two (2) ways.

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[1] SC and electrical conductivity (EC) are used interchangeably throughout the testimony.

First, the City will be prevented from diverting under its DWSPWTP water right because of the increasing EC levels in Delta water diverted for drinking water treatment as that water ultimately is discharged through the sanitary collection system for treatment at the City's wastewater treatment plant, which has a discharge limit on EC. The City's wastewater NPDES permit limits salinity in the City's treated wastewater discharge to the San Joaquin River and requires the City to prepare and annually update a Pollution Prevention Plan (PPP) for Salinity in order to meet the requirements of Water Code section 13263.3(d)(3). (California Regional Water Quality Control Board, Central Valley Region, Order R5-2014-0070-02, Attachment E, section IX.D.1, p. E-22; Exhibit STKN-050 is a true and correct copy of California Regional Water Quality Control Board, Central Valley Region, Order R5-2014-0070-02, Attachment E.) The provisions of Water Code section 13263.3 (Section 13263.3) specify that the PPP estimate all sources of salinity in the Publicly Owned Treatment Works (POTW) influent, analyze the methods that could be used to prevent the discharge of salinity to the POTW and the associated costs, and impacts to implement a PPP. One source of salinity in the City's wastewater discharge is the salinity in the City's source water supply. (STKN-021, p. 2.) Whenever the salinity concentration of water at the intake increases above 110 mg/L, the City is faced with the decision to forego diversions under its Delta water right for drinking water purposes in favor of purchased water or groundwater, or be forced to implement additional treatment such as reverse osmosis.

Increased salinity in the City's source water has a direct effect on Stockton's ability to comply with its NPDES permit, which establishes limits on the salinity in the City's wastewater discharges for salinity. (STKN-021.) This information was presented in the City's March 17, 2017 comments to the State Board's 2016 Phase 1 Bay-Delta Plan amendment and Substitute Environmental Document. As part of the City's effort to control source water salinity, the City procured and incorporated the DWSPWTP water right into its supply and obtained a corresponding reduction in effluent salinity. (City of Stockton's Comments on 2016 Phase 1 Bay-Delta Plan Amendment and Substitute

Environmental Document, March 17, 2017, pp. 7-9; Exhibit STKN-040 is a true and correct copy of the City of Stockton's Comments on 2016 Phase 1 Bay-Delta Plan Amendment and Substitute Environmental Document.) Increasing salinity in Delta source water for municipal and industrial use due to the Project would threaten to cause NPDES violations.

Second, qualitatively, Stockton's water customers are accustomed to and expect a water supply with the salinity levels delivered by the City. Drinking water regulations that limit salinity that are known as "Consumer Acceptance Contaminant Levels" for the salinity-related constituents which include chlorides, Total Dissolved Solids (TDS), and SC. Increased surface water salinity due to the Project would erode customer confidence and cause economic impacts if current industrial water users were forced to invest in on-site treatment or choose to leave the City for other water service providers that offer better water quality. If the City were required to fund additional treatment technology to reduce Delta water salinity, that would necessarily increase treatment process and service costs and directly impact the City's ability to serve its customer base, which includes a substantial number of economically disadvantaged persons. As a point of comparison, Dr. Bryan's use of the 250 mg/L threshold is substantially higher than the 30 mg/L chloride level that Petitioners agreed to meet in the delivered water they have promised to Contra Costa Water District (CCWD) in their settlement resolving CCWD's protest to the Project's water rights change petition. (Agreement for Mitigation of Impacts to Contra Costa Water District from Construction and Operation of Bay Delta Conservation Plan/California WaterFix, March 24, 2016, pp. 18-19.)

Similar to chloride, SC is a secondary contaminant under Title 22 that affects customer acceptance and satisfaction. (Cal. Code Regs., tit. 22, § 64449.) Dr. Bryan's report states that increases in SC "would not be of a magnitude that would cause an exceedance of the applicable drinking water MCLs on a mean monthly basis." (DWR-652, p. 31.) The recommended level for SC for drinking water is 900 micro-Siemens/cm. (*Id.*) In 2015, Stockton's treated drinking water ranged from 71 to

614 micro-Siemens/cm. So, while Stockton's treated drinking water remains below the applicable maximum contaminant levels (MCLs), it is impossible to know whether the Project will result in SC that exceeds the 1,600 micro-Siemens/cm maximum because Dr. Bryan's testimony presents information only in terms of long-term monthly averages. The only treatment for SC is reverse osmosis. Since SC is a secondary contaminant, Stockton would be required to incur significant expense by either upgrading the water treatment facility to include reverse osmosis, or finding alternative sources to satisfy the City's demand.

Dr. Bryan's testimony and report relies on long-term monthly averages and ignores the potential for real time impacts to the City's water treatment facility and the City's customer base that will occur from substantial short-term increases in a variety of constituents. By using only long-term monthly averages, Dr. Bryan's testimony and report cannot be used to determine that the operations of the Project will not impact the City's ability to deliver a safe and reliable water supply under the Project's proposed alternatives. Stockton's water treatment and wastewater treatment facilities were designed and operate based on the salinity levels that have been typical at Stockton's drinking water intake. The substantial short-term increases in constituent levels caused by the Project that are identified in Dr. Paulsen's expert reports would at times prevent the City from diverting and using water under its water right permit without further significant investments in water treatment equipment and processes such as reverse osmosis.

b. Disinfection By-Products: Bromide, Bromate and Trihalomethane

Dr. Bryan correctly states there are no adopted state or federal surface water quality criteria or objectives for bromide that are applicable to the Delta. (DWR-652, p. 7.) However, Stockton's intake will receive a significantly higher proportion of water originating from the San Joaquin River water under the Project. The mean dissolved bromide levels in San Joaquin River are on the order of 251 µg/L, which is nearly 17 times that of the Sacramento River. (DWR-652, p. 7, Table 1.) Furthermore, the mean

concentrations of East Side tributaries and Delta Ag return flows are on the order of 16 µg/L and 456 µg/L, respectively. (*Id.*) The City already experiences a significant impact to its drinking water treatment process when bromide is in the range of 200 µg/L. This is due to the fact the City uses ozone for pretreatment disinfection and has a significantly large water distribution network that has the effect of increasing the levels of the disinfection byproduct trihalomethane (THM) in the drinking water. The most effective way to reduce the formation of brominated disinfection byproducts (DBP) is to treat waters that are lower in bromide concentrations.

The 1998 California Urban Water Agencies (CUWA) Draft Final Bay-Delta Water Quality Evaluation (1998 CUWA Water Quality Evaluation; Exhibit STKN-042 is a true and correct copy of the 1998 CUWA Water Quality Evaluation) referenced in Dr. Bryan's report concluded that <50 µg/L of bromide would be necessary to allow users the flexibility to incorporate either enhanced coagulation or ozone disinfection to meet the potential long-term regulatory scenario for the treatment of Delta source water. (*Id.* at p. 4-21.) Dr. Bryan states that the WaterFix EIR/EIS assessment for bromide used 50 µg/L and 100 µg/L as assessment thresholds; however, "[t]he 50 µg/L threshold proved to be of little utility for assessing bromide changes in the interior Delta locations and the San Joaquin River near the City of Stockton's WTP intake location because this threshold was shown from modeling to be exceeded 100% of the time for all scenarios modeled." (DWR-652, p. 8.)

Presently, the City can use water from the DWSPWTP with bromide concentrations between 100 µg/L and 150 µg/L. When bromide concentrations reach 200 µg/L the City must employ a pretreatment process using chloramines in conjunction with ozone. This pretreatment process consumes the ozone very quickly thereby requiring an increase in the ozone dose. Increasing the ozone dose causes an increase in operating costs as ozone is the most power consuming process at the water treatment plant. Dr. Bryan's report shows that average bromide concentrations will be substantially higher than the No Action Alternative in all scenarios and substantially increase the

frequency of concentrations above 200 mg/L. (DWR-652, p. 17, Figure 11.) This will cause the City significant injury by forcing it to employ pretreatment with chloramines and incurring the costs of increased ozone doses and associated electrical costs. Under alternative 4A, bromide levels in the City's source would increase by 50 µg/L, 50% of the time. Bromide in the source water will form bromate in the treatment process. Bromate is a DBP which is regulated to 10 µg/L. If concentrations of bromide in the City's source water exceed 200 µg/L, Stockton would not be able to use water under its existing ozonation pretreatment process to control taste and odor compounds (Methyl-Isoborneol (MIB) and geosmin). If the quality of the taste and odor of Stockton's water is degraded to the point that it is unusable in light of the City's existing facilities, the City will be injured because it will be forced to bear the cost of finding an alternative source of water or investment in additional treatment processes such as Granular Activated Carbon (GAC) adsorption. The City investigated GAC as an alternative to implementing chloramines as a residual disinfectant to control DBP formation in the City's large distribution network. In 2012, it was demonstrated that GAC contactors would cost the City an additional $5.4 million per year in capital and operation and maintenance cost, which would result in a 23% increase in customer water rates (Chloramine Conversion Treatment Cost Comparison and Other Concerns presentation to Stockton Council Water Committee, November 13, 2013; Exhibit STKN-043 is a true and correct copy of Chloramine Conversion Treatment Cost Comparison and Other Concerns presentation to Stockton Council Water Committee.)

Aside from having to compete for increasingly scarce water supplies, Stockton faces an array of challenges to maintain a safe and reliable source of water, including "new State and federal drinking water regulations [that require] greater levels of treatment." (The Significance of Bromide on the Drinking Water Quality of Sacramento-San Joaquin Delta Waters, D-044904, p. 1; Exhibit STKN-044 is a true and correct copy of The Significance of Bromide on the Drinking Water Quality of Sacramento-San Joaquin Delta Waters.) The cost of treating Delta waters to meet those new standards

will be "staggering to the drinking water industry." (*Id.*) In addition, to minimize THM formation, California water utilities must have best available treatment technologies available such as ozone and chloramines, but at an extensive investment cost. (Delta Water Quality: A Report to the Legislature on Trihalomethanes and the Quality of Drinking Water Available from the Sacramento – San Joaquin Delta, State Water Resources Control Board, Department of Public Health, and Department of Water Resources, 1991; Exhibit STKN-045 is a true and correct copy of Delta Water Quality: A Report to the Legislature on Trihalomethanes and the Quality of Drinking Water Available from the Sacramento – San Joaquin Delta.) The Project will cause higher bromide concentrations at the City's drinking water intake, which will cause the City to incur significant costs installing additional treatment processes or finding a substitute water source.

c. Total Organic Carbon

Similar to bromide, Table 13 in Dr. Bryan's report lists source water concentrations of organic carbon as a mean monthly basis. (See DWR-652, p. 42.) In this table, it is shown that San Joaquin River dissolved organic carbon (DOC) ranges from 3.4 to 4.8 mg/L. (*Id.*) In the recent drought, Stockton experienced DOC values in the 5.0 to 11.0 mg/L range. Even when total organic carbon (TOC) values are in the recommended range of 4.0 to 7.0 mg/L, controlling DBP's in a large distribution system like Stockton's has proven difficult. The 1998 CUWA Water Quality Evaluation referenced in Dr. Bryan's report concluded that <3 mg/L of TOC would be necessary to allow water users the flexibility to incorporate either enhanced coagulation or ozone disinfection to meet the potential long-term regulatory scenario for the treatment of Delta source water. (STKN-042, p. 4-21.) Similar to bromide, rising TOC concentrations would require the City to invest in additional treatment processes or alternative water supplies in order to control DBP's beyond what is currently contemplated based on existing Delta water quality. Current treatment with ozone is effective because it oxidizes taste and odor constituents, like MIB and geosmin, and provides a good

complement to existing treatment processes, but its use is limited by the formation of bromate at times when bromide and TOC are elevated in the source water. The City monitors TOC on a daily basis and when TOC rises above 4 mg/L the City implements pretreatment with chloramines in conjunction with ozone. Increased TOC due to the Project would result in a direct impact to current water treatment operations costs, or when limited by bromate formation, would force the City to invest in GAC treatment in order to continue to use diverted water under its water right. Dr. Bryan's approach to presenting model results in the form of long-term averages ignores the day-to-day operation and monitoring of a drinking water treatment plant, and Dr. Bryan's determination regarding Project effects on the City's use of water under its water right fails to account for the costs associated with complying with State and federal drinking water standards.

Drinking water regulations under the Disinfectants–Disinfection Byproducts Rule require that water treatment plants reduce or remove organic matter prior to adding disinfectant. Dr. Bryan's testimony and report fail to recognize the totality of Delta water constituents that affect the treatability of the water, such as bromide, TOC, pH, ammonia, alkalinity and temperature, along with requirements for treatment contact time. For instance, the City is required by the City's drinking water permit issued by the State Water Resources Control Board to achieve higher TOC removal rates under lower alkalinity values. Increased TOC in source water from the Project would require Stockton to have to change to water treatment processes, such as enhanced coagulation or GAC adsorption, or to find alternative sources of water. These issues have been presented previously in Stockton's testimony and in comments to the Bay Delta Conservation Plan and EIR/EIS.

d. Microcystis

Dr. Bryan's testimony and report claim the Project would not change Delta hydrodynamics and temperature, effects that will increase the likelihood of harmful algal blooms (HABs), and microcystis contamination in the City's drinking water. (DWR-652,

pp. 54-55.) However, the expert testimony of Dr. Paulsen (STKN-025, STKN-027, STKN-047, and STKN-048) shows that the Project will substantially increase residence times at the times when temperatures are highest, thus increasing the likelihood and frequency of HABs and microcystis formation. It is likely that even a slight increase in HABs and microcystis will have an impact on the City as a legal user of water, due to the effect on the City's ability to treat Delta water with current treatment technologies. Ozonation, which is used by the City, is recognized as an effective process for the destruction of both ultra- and extracellular microcystis, but at a relatively high dose dependent upon background DOC levels. However, ozone breaks apart the algae cells and releases toxins, which would create an unreasonable health risk to Stockton's drinking water customers unless additional treatment with GAC is employed. Prior to cell removal, the total and dissolved organic carbon load of water with cyanobacterial blooms will vary by orders of magnitude, and consumption of the oxidant (ozone) will therefore also vary widely. Continuous control of the oxidizing step and very high doses may be necessary to ensure complete oxidation of cyanotoxins in one pretreatment step. This is likely to be difficult in practice, and is associated with a risk of toxin liberation. (Chorus and Bartram, Toxic Cyanobacteria in Water: A Guide to Their Public Health Consequences, Monitoring and Management, 1999; Exhibit STKN-046 is a true and correct copy of Toxic Cyanobacteria in Water: A Guide to Their Public Health Consequences, Monitoring and Management.) Therefore, even a slight increase in HABs or microcystis will injure the City as a legal user of water by increasing the cost and complexity of its water treatment process and potentially rendering the source water unusable at times to avoid a risk to public health.

III. CONCLUSION

Petitioners have not presented evidence that shows no injury to Stockton. Stockton's DWSPWTP and the accompanying water right were designed and constructed based on historical and predicted flows and water quality in the Delta. The CWF would alter those flows and cause water quality changes that would prevent

Stockton from using its DWSPWTP water right, forcing the City to find other unknown sources of supply, or investing in additional, expensive treatment processes. Dr. Bryan's report masks substantial increases in various constituents by using long-term monthly averages and thus fails to address water quality changes that affect the City's ability to treat Delta water so that it remains usable by the City's customers.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this 9th day of June 2017 in Stockton, California.

Robert Granberg