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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.	**PART TWO TESTIMONY OF RUBEN R. ROBLES, P.E.**

This testimony is offered on behalf of the Sacramento Regional County Sanitation District (Regional San).

I. INTRODUCTION

My name is Ruben R. Robles. I am the Director of Operations for the Sacramento Regional County Sanitation District (Regional San). I have been in my current position since August of 2010. I have been a Regional San employee for 24 of the 26 years that

I have been employed by the County of Sacramento, with the remaining 2 years having worked for the Sacramento County Department of Waste Management. Regional San has its own Board of Directors and budget, but contracts with the County of Sacramento for its public sector staff.

As Director of Operations, I am directly responsible for managing the operation and maintenance of the Sacramento Regional Wastewater Treatment Plant (SRWTP), the operation and maintenance of the large pipe interceptor system that conveys wastewater to the SRWTP, and the planning, design, construction and commissioning of the EchoWater Project, which is discussed further below.

I have worked in a variety of positions in Regional San. These have included the Department of Policy and Planning, where I was involved in Regional San's long-term planning efforts and regulatory development. I have also managed Regional San's biosolids, water recycling, and asset management programs.

I hold a Bachelor of Science degree in Civil Engineering, a Master of Science degree in Civil Engineering, and a Master of Business Administration, from California State University Sacramento. I am also a registered civil engineer in the State of California. My testimony addresses the WaterFix impacts on Regional San's wastewater treatment operations.

II. REGIONAL SAN PLANT OPERATIONS

Regional San provides wastewater conveyance, treatment, and disposal for approximately 1.4 million people in the urbanized area of Sacramento County and the City of West Sacramento in Yolo County. Regional San owns and operates the Sacramento Regional Wastewater Treatment Plant (SRWTP) located approximately 10 miles south of downtown Sacramento, at 8521 Laguna Station Road in Elk Grove, California. The SRWTP receives wastewater from businesses and residences collected in local wastewater collection systems operated by the City of Folsom, City of Sacramento, City of West Sacramento, and the Sacramento Area Sewer District. The SRWTP is surrounded by 2,150 acres of open space called the Bufferlands. The

Bufferlands not only minimizes the potential for odor and other nuisances to nearby neighborhoods, but it is also an important nature area that provides hundreds of acres of high quality wildlife habitat, farmland, and open space in a rapidly urbanizing area of California.

Regional San has more than 425 employees and operates the SRWTP 24 hours per day, seven (7) days per week throughout the year to safely treat wastewater in accordance with public safety and environmental protection laws and regulations, and as required by our National Pollutant Discharge Elimination System (NPDES) permit. (Exhibit SRCSD-3.) The SRWTP currently treats wastewater through a series of treatment steps using physical, biological, and chemical processes. Primary treatment removes waste through physical gravity settling and surface skimming processes. Secondary treatment is a biological process that uses naturally occurring microorganisms to remove organic waste from the wastewater. Pure oxygen is generated on-site and injected into aeration tanks, where it is mixed with the wastewater flow and microorganisms that break down the organic material. Following biological secondary treatment, liquid sodium hypochlorite is added to the treated effluent for disinfection to destroy pathogenic organisms. The chlorinated effluent travels approximately two (2) miles to the Outfall Facility where sodium bisulfite is added to the treated effluent for de-chlorination before the water is discharged to the Sacramento River. The treated effluent is discharged to the Sacramento River just downstream of the Freeport Bridge, through a high rate diffuser designed to rapidly mix the treated water with the Sacramento River. The diffuser is a large 10-foot diameter pipe on the bottom of the Sacramento River, oriented perpendicular to the direction of river flow with 74 exit "ports" (or openings) through which the treated effluent is released. The SRWTP has a permitted capacity based on average dry weather flow of 181 million gallons per day (MGD), and over the past decade, has discharged, on average, 133 MGD.

Discharge from the SRWTP is authorized and regulated under an NPDES permit issued by the California Regional Water Quality Control Board, Central Valley Region

(Regional Water Board). During the course of day-to-day operation, the SRWTP is required to perform numerous laboratory analysis during each phase of treatment for both regulatory compliance and process control. As a result, lab work is an essential function of the wastewater treatment plant operation. SRWTP has a state-of-the art onsite laboratory that employs trained professional chemists, biologists, and other technical staff who provide analytical services to ensure that SRWTP's plant operations comply with its NPDES permit and environmental monitoring requirements. In addition to providing standard analyses (including trace metals, organics, conventional chemistry, bacteriological, microbiological, and toxicological analysis), the laboratory also conducts field monitoring and sample collection of groundwater and monitors the water quality of the Sacramento and American Rivers in the Sacramento metropolitan area.

The Sacramento River at Freeport is tidally influenced and highly variable. One requirement of the NPDES permit is that the SRWTP is prohibited from discharging effluent to the Sacramento River when the ratio of river flow to effluent flow is less than 14:1. This prohibition has existed in all of Regional San's NPDES permits since 2000, but SRWTP has been operating with this requirement since mid-1990. In the current NPDES permit this limitation is contained in III.F of the NPDES Permit. (Exhibit SRCSD-3, p. 4.)

When the river-to-effluent flow ratio is less than 14:1, SRWTP effluent must be diverted to emergency storage basins (ESBs) rather than being discharged. Typically, in these circumstances, diversion is to ESB-D, until the river-to-effluent flow ratio rises above 14:1 again. In the past, the duration of these river-to-effluent flow diversions has ranged from as short as one (1)-hour to as long as five (5) hours, and diversion events may occur twice per day over a period of many days, depending upon the tidal and river conditions. These types of diversions typically occur when Sacramento River flows are low and downstream tides are high. When this combination of factors occurs, the Sacramento River flow at Freeport can reverse direction, temporarily flowing upstream. Flow reversals and diversions may occur at any time of year, but tend to occur most

frequently during the months of May to October. At the end of each of these diversions, SRWTP must return the diverted water out of ESB-D and back to the river using the ESB-D pumping station to restore ESB-D capacity.

There is a host of other discharge and compliance requirements that are included in our NPDES permit, including thermal requirements. Thermal requirements, shown in Exhibit SRCSD-3 at pages 6 and 10, prohibit the temperature of the effluent discharge to exceed the river temperatures by more than 20°F from May 1 to September 30 or by more than 25°F from October 1 to April 30. Additionally, the temperature of the effluent discharge shall not cause an increase of either 1°F or 2°F in more than 25% of the cross-section of the river, depending on the river's temperature, or more than 4°F at the river's surface at any time. SRWTP continuously monitors the effluent, influent, and river temperatures, and utilizes alarms and computer control programs to maintain compliance. SRWTP operators also implement operational strategies that consist of storing effluent in the ESBs for passive cooling of the effluent, which is discussed below.

Since adoption of the NPDES permit in December 2010, Regional San has engaged in a major effort directed toward the planning, design, construction and commissioning of capital facilities required for compliance with the NPDES permit. This project, known as the EchoWater Project, is estimated to cost between $1.7 and $2.1 billion. Upgrades to the SRWTP that will occur with the EchoWater Project include replacement of the existing pure oxygen biological treatment facilities with Biological Nitrogen Removal (BNR) facilities. BNR is an air activated treatment process capable of removing an estimated 95% of the ammonia from wastewater and reducing the nitrate produced by ammonia removal to a concentration less than 10 milligrams per liter (mg/L). The EchoWater Project will also install tertiary treatment processes, including filtration with granular media filters. In addition, the EchoWater Project includes side-stream ammonia treatment, and it will increase the capacity of the lined emergency storage basin facilities (flow equalization). Construction of the EchoWater Project is underway and is among the largest public works projects in Sacramento's history, and is

currently employing over 300 construction workers. The SRWTP must have the BNR nitrogen removal facilities constructed and operational by May 11, 2021, and the Title 22 equivalent filtration and disinfection facilities must be operational by May 9, 2023. (See Exhibit SRCSD-3, pp. 21-22)

Regional San currently provides up to 2.6 million gallons per day (MGD) of recycled water for beneficial reuse during the dry weather months, with an approved and existing water right order to provide up to 10 MGD of recycled water. Once the EchoWater Project is complete, the vast majority of the plant effluent will be disinfected tertiary treated water that will be suitable for recycling and reuse for a broad range of beneficial uses. Regional San is planning for a substantial increase in recycled water use in the Sacramento region, and has a wastewater petition for a change in the place of use pending before the State Water Resources Control Board (State Water Board) for the South Sacramento County Agricultural and Habitat Lands Recycled Water Program. This project will deliver up to 50,000 acre feet per year of recycled water to approximately 16,000 acres of agricultural land in southern Sacramento County. Testimony on Regional San's water recycling projects was submitted during Part 1 of this proceeding. (See Exhibits SRCSD-1, SRCSD-2.)

III. SRWTP'S EFFLUENT DIVERSION OPERATIONS

To provide additional operational flexibility and also meet permit requirements, a key process component of the SRWTP is the ESBs. As part of the ongoing EchoWater Project, Regional San recently expanded the ESB operating capacity at SRWTP from 290 to 400.7 MGD, for needed additional operational capacity, flexibility, and reliability. This Flow Equalization Project (FEQ) deepened existing earthen storage basins (ESBs A-C), lined the basin walls and floor with concrete, installed under-drain piping and pumping, and provided flow control structures and remote/manual water cannons for cleaning the basins after use. The FEQ project will be largely completed in 2017, and once completed the total cost for this project is estimated to be $190 million, equivalent to a unit cost of $ 0.59 per gallon of basin capacity.

ESB-D is an existing storage basin with a 60-Mil (60/1000-inch-thick) reinforced polypropylene liner and a capacity of 78 MG. ESB-D was not part of the FEQ project, and as a result, was not improved. ESB-D is only used when effluent must be diverted to comply with the minimum river-to-effluent flow ratio or with the temperature requirements, then the effluent is pumped to the river once environmental circumstances (river flow or effluent temperature) are favorable. Final effluent diversion to ESB-D is a complex task carried out by trained and certified SRWTP wastewater treatment plant operators. SRWTP monitors plant processes and river conditions and employs several alarms to alert when diversions are needed. Timely operator actions are required to initiate a diversion, cease discharge to the river, and then empty ESB-D as soon as reasonably possible to ensure there is adequate capacity for the next diversion. Flow diverted to ESB-D can be pumped directly into the outfall (up to 190 MGD) or can be returned to the plant influent via the City Interceptor.

Raw influent, primary effluent or secondary effluent may be diverted to ESB A, B, C1, C2, or C3 for a variety of reasons, but primarily for plant shutdowns for maintenance of critical equipment, excess peak wet weather flows above treatment plant capacity, or water not meeting water quality targets. The water diverted, starting with ESB A and flowing to C3 if needed, is returned to the headworks of SRWTP for full treatment, and requires cleaning of the basin(s).

The FEQ Project includes a large diversion pipeline and structures for diverting final effluent after disinfection to ESBs for passive flow-through cooling. Passive cooling of the effluent is achieved as effluent is exposed to cooler and drier ambient air through the basin water surface and due to the concrete lining the basin, which is in contact with cooler ground temperatures. This process is controlled by large gate structures that maintain relatively low water depth to maximize the surface to depth ratio for the total volume of effluent in temporary storage. The cooled effluent is then returned slowly from ESB-C3 through ESB-D, where the cooled effluent is discharged to the outfall using the ESB-D pumping station.

The BNR activated sludge treatment facility, which is under construction, has been designed to process up to 330 MGD. Influent flows in excess of 330 MGD will be stored in the ESBs and returned for processing through the BNR facilities when capacity is available.

Operations staff must carefully balance the of operation of the plant, while always meeting the minimum 14:1 river:effluent ratio, thermal compliance, and other permit and operating requirements tied to the conditions in the river. Regional San maintains cooperative agreements with the California Department of Water Resources and the United States Geological Survey (USGS) for the operation and maintenance of the two flow monitoring stations on the Sacramento River at the Freeport Bridge (USGS Station 11447650). Regional San also coordinates operations with the Freeport Regional Water Authority (FRWA) to substantially eliminate water supply diversions during reverse flow events, and reduce the potential for diluted SRWTP effluent from reaching the FRWA water intake.

IV. WATERFIX IMPACTS ON SRWTP OPERATIONS

For years, Regional San has commented on and expressed concern over potential impacts of the Bay Delta Conservation Plan (BDCP) and California WaterFix (WaterFix) on the operation of SRWTP. Regional San has commented about the potential significant impacts caused by WaterFix–related changes in river temperature, water quality, and the number and duration of low-flow and reverse flow periods in the river. In particular, Regional San is concerned that WaterFix may alter the conditions of the Sacramento River at Freeport, such that Regional San would need to divert effluent to emergency storage basins more often, for longer durations and in larger quantities than under existing conditions. Regional San's concerns were not addressed in the BDCP and WaterFix Draft or Recirculated Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS). To my knowledge, these concerns have not been addressed in any evidence presented to date by the Petitioners in this proceeding.

Section 3B.3.6 of WaterFix Final EIR/EIS contains one paragraph related to Regional San's concerns, which states: "Modeling shows that operation of Alternative 4A may increase the frequency of reverse flows in the lower Sacramento River at Freeport, relative to the No Action Alternative, based on certain low flow conditions and flood tides." (Exhibit SWRCB-102, p. 3B-81.) These increased reverse flow events at Freeport have the potential to cause Regional San to limit discharges from its SRWTP to the Sacramento River and hold treated effluent in its storage basins until downstream river flow resumes to a minimum of 14:1 river:effluent ratio and thus river discharge can resume. Despite recognizing that operation of the WaterFix Project will adversely affect Regional San's operation, DWR adopted no mitigation for this significant impact.

My testimony below will only focus on some of the anticipated impacts to Regional San's operations that can be quantified with currently available information and to the best of our ability.[1] In preparing my testimony, I relied on modeling results and analysis presented in the testimony of Dr. Susan Paulsen. (Exhibit SRCSD-29.)

As demonstrated by Dr. Paulsen's testimony, the modeling results and analysis show that all of the WaterFix alternatives[2] increase the number of SRWTP diversions to ESBs, the frequency of the diversions, and the length of time effluent is stored in the ESBs after EchoWater is completed. Essentially, low flow events in the Sacramento River will increase substantially as a result of WaterFix. A summary of the ESB Modeling results is shown in Table 1.

[1] The total potential impacts to the operation of the SRWTP from the WaterFix are extremely difficult to determine and quantify at this time due to the complex and ever-shifting nature of WaterFix and the lack of relevant modeling data, as described in Dr. Susan Paulsen's testimony (Exhibit SRCSD-29). Although additional impacts are possible, due to the limited information made available by the Project proponents, this testimony focuses on impacts that Regional San was able to evaluate in light of available data. The Testimony of Thomas Grovhoug (Exhibit SRCSD-16) also addresses a separate topic of potential future regulatory requirements.

[2] The modeling scenarios evaluated by Dr. Paulsen for water years 1976-1991, include two(2) baseline scenarios (the existing conditions [EBC2] and no action alternative [NAA] scenarios and four WaterFix project scenarios (H3, H4, Boundary 1, and Boundary 2), as presented in this proceeding and as further described in the Testimony of Susan Paulsen (Exhibit SRCSD-29).

Table 1. Summary of ESB-D Cost Allocation Based on Modeling Results

	Alternatives	EBC2	NAA	B1	B2	H3	H4
	Cumulative volume pumped out of ESBs (billion gallons [BG])	64	89	93	93	96	100
	Number of diversions	2704	3571	3930	3901	3982	4189
EBC2	Change in number of diversion events compared with EBC2 (%)		32%	45%	44%	47%	55%
	Diversions resulting from WaterFix as a % of Total[1]			31%	31%	32%	35%
	WaterFix share of ESBD Cost[2], $M			$14.4	$14.1	$14.8	$16.3
NAA	Change in number of diversion events compared with NAA (%)			10%	9%	12%	17%
	Diversions resulting from WaterFix as a % of Total[1]			9%	8%	10%	15%
	WaterFix share of ESBD Cost[2], $M			$4.2	$3.9	$4.7	$6.8

[1] – Diversions resulting from WaterFix as a % calculated as (Increase in Diversions by WaterFix/Total number of diversions), e.g. B1 versus EBC2 = (3930-2704)/(3930)=31%

[2] – WaterFix share of ESBD Cost calculated as Total ESBD cost x Diversions resulting from WaterFix as % of Total e.g. B1 vs EBC2 = $46 million x 31% = $14.4 million

Regional San planned, designed, and constructed the expanded and lined ESBs (except ESB-D) in consideration of future operations and contingencies, and before it was understood that the WaterFix project would increase the number of SRWTP diversions required. Because the number of diversions after WaterFix will be greater than anticipated when the ESB project was designed, Regional San will lose a portion of the operational flexibility it built into the SRWTP and lose potentially needed capacity in its ESBs.

The SRWTP storage facility most affected by WaterFix operations is ESB-D. ESB-D is used primarily for temporary storage of final effluent when discharge to the river is prohibited. ESB-D is used every time a diversion for low river flows is required. Therefore, every time WaterFix necessitates a diversion in excess of the baseline

condition, WaterFix is effectively taking possession of Regional San facilities and requiring Regional San to commit its facilities to WaterFix. This reduces Regional San's operational flexibility and places unknown risks related to Regional San meeting its NPDES permit obligations.

The cost of re-lining ESB-D, providing possible underdrain piping and underdrain pumping, and remote/manual water cannons for cleaning the basin after use is estimated at 78 MG x $0.59/gallon = $46 million (the per gallon construction cost was derived from Regional San's FEQ project costs). These modifications to ESB-D were not included in the FEQ project, because ESB-D did not require modifications at that time.

Using EBC2 as a baseline, WaterFix increases the number of diversions to ESB-D by between 44% and 55%, and these WaterFix diversions represent 31% to 35% of the total number of diversions for this baseline. Using NAA as a baseline, WaterFix increases the number of diversions to ESB-D by between 9% and 17%, and these WaterFix diversions represent 8% to 15% of the total number of diversions for this baseline. The WaterFix use of Regional San's SRWTP ESB-D facilities is valued at between $14.1 million and $16.3 million using ESB2 as a baseline, or $3.9 million and $6.8 million using NAA as a baseline.

However, because there is limited operational information on WaterFix and there was only 16 years of modeling information provided by the proponents (which may not be reflective of worse case or future river conditions), it is difficult for Regional San to know whether it will be able to maintain the SRWTP's intended operational flexibility, ESB capacity and NPDES compliance obligations. The ESB-D discharge pumps can deliver up to 190 MGD to the outfall. More frequent operation of the ESB-D pumping station will result in increased wear and tear on the ESB-D pumps and accelerated failure of these units. The cost of the ESB-D pump replacement has been estimated based on other recent projects and is approximately $10 million. Using the same percentages as described above, the capital cost allocation to WaterFix for the ESB-D

pump replacement ranges between $846,000 and $3.55 million, depending on the baseline selected.

Regional San staff also estimated the operations and maintenance cost of WaterFix impacts due to diversions and length of time effluent is stored in the ESBs. Increased operational costs will occur from increased electrical pumping costs and more frequent cleaning of ESB-D. Tables 2 and 3 summarize the potential cost estimates to Regional San for the WaterFix alternatives presented in this hearing. These costs do not include additional maintenance required on all affected assets Regional San owns that would require more frequent use due to WaterFix, nor does it consider cost impacts related to operational flexibility or non-compliance with NPDES permit obligations as a result of WaterFix.

Table 2 – Estimated Electrical Cost per Modeling Results

WaterFix Modeled Scenarios	Cum Vol pumped out of ESB-D (from modeling efforts), MG	Total Pumping Cost, $ (based on current year electrical costs)	Cost/year, $
EBC2	63,928	$997,916	$62,370
NAA	89,034	$1,389,821	$86,864
Boundary 1	93,087	$1,453,088	$90,818
Boundary 2	92,643	$1,446,157	$90,385
H3	95,590	$1,492,160	$93,260
H4	100,046	$1,561,718	$97,607

Table 3 – Estimated Cleaning Cost for ESB-D per Modeling Results

WaterFix Modeled Scenarios	# of Diversions in 16 years	# of wash-downs in 16 years	Cost/year, $
EBC2	2704	1352	$30,843
NAA	3571	1786	$40,743
Boundary 1	3930	1965	$44,827
Boundary 2	3901	1951	$44,507
H3	3982	1991	$45,420
H4	4189	2095	$47,792

V. CONCLUSION

The SRWTP treatment processes described in my testimony are only a brief summary of the complex operations that are undertaken each and every day by Regional San staff. Constructing EchoWater, one of the region's largest public works projects, while operating the existing treatment plant and complying with our NPDES permit requirements shows Regional San's commitment to protecting public health and the environment. The SRWTP is one of the largest wastewater treatment plants in the State of California, and when the EchoWater Project is completed, it will be one of the most advanced. SRWTP permit requirements and operational parameters are directly tied to the conditions in the Sacramento River and the Delta ecosystem. Regional San wants to ensure that any changes to those conditions resulting from WaterFix that affect Regional San and the public it serves are fully mitigated. If our ability to discharge treated effluent to the Sacramento River is impacted, or if future NPDES permit requirements are imposed as a result of WaterFix, our ratepayers should not be burdened with the additional infrastructure, operation and maintenance, and other compliance costs that may be imposed on Regional San. Regional San has provided estimated costs for operational impacts due to WaterFix based on the information known to date. For example, the estimated costs due to WaterFix summarized in Section IV above, only account for low river conditions due to WaterFix. Those costs do not consider WaterFix impacts to SRWTP diversions required for maintenance, shut downs, or other diversion needs because it is not possible to forecast those additional impacts at this time. In addition, should WaterFix be implemented, actual impacts on Regional San operations may be different and more extensive than those based on current WaterFix planning and design assumptions. For instance, these costs do not consider cost impacts related to operational flexibility or non-compliance with NPDES permit obligations as a result of WaterFix. Therefore, WaterFix impacts to Regional San operations may be underestimated.

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

Executed on this 30th day of November, 2017 in Sacramento, California.

RUBEN ROBLES, P.E.