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9 BEFORE THE

10 CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

11 HEARING ON THE MATTER OF
12 CALIFORNIA DEPARTMENT OF WATER
RESOURCES AND UNITED STATES
13 BUREAU OF RECLAMATION REQUEST
FOR A CHANGE IN POINT OF
14 DIVERSION FOR CALIFORNIA WATER
FIX.

**TESTIMONY OF FORREST W.
WILLIAMS, JR.**

15
16 **I. INTRODUCTION**

17 My name is Forrest W. Williams Jr., and I currently serve as a Senior Civil
18 Engineer for Sacramento County Department of Water Resources. I am a licensed civil
19 engineer with the State of California, and I have been a Sacramento County Department
20 of Water Resources employee for over twenty (20) years. During that time, I have
21 worked in Drainage Design, Water Supply Planning and Development, Water Supply
22 Regional Projects, and the Water Supply Regulatory Group.

23 As a Senior Civil Engineer for the County for the last eight (8) years, and for
24 twelve (12) years prior to that as an Assistant then Associate Civil Engineer, I have
25 focused on water supply planning, acquisition, permitting, infrastructure, operation and
26 maintenance issues for Sacramento County Water Agency (SCWA). Sacramento
27 County Department of Water Resources employees are the employees for the SCWA, a
28 dependent special district established in 1952 by the Sacramento County Water Agency

1 Act (See Water Code App. Chapter 66, commencing at section 66-1 et seq.) I am
2 responsible for SCWA's groundwater and surface water regulatory programs, in addition
3 to all water conservation programs, recycled water program administration, and water
4 supply contract reporting to the State Water Resources Control Board. I also serve as
5 an Alternate Board Member for the Sacramento Central Groundwater Authority. Over
6 the course of my career, I have gained a great deal of experience relative to water
7 supply reliability, surface water rights, CVP supplies and groundwater supplies.

8 In addition to my role with SCWA, I serve as the Program Manager for the
9 Freeport Regional Water Authority (FRWA) Joint Powers Authority. FRWA was created
10 in 2002 between SCWA and East Bay Municipal Utility District (EBMUD) to guide the
11 financing, ownership, development, construction, and operation of the Freeport Regional
12 Water Project (FRWP). FRWP is a cooperative effort of SCWA and EBMUD to supply
13 surface water from the Sacramento River to customers in central Sacramento County
14 and the East Bay area of California via a water intake facility and pumping plant on the
15 Sacramento River at the Freeport Bend, approximately ten (10) miles south of downtown
16 Sacramento. In my role as Program Manager for FRWA, I plan and direct all activities of
17 FRWA, authorize expenditures, have charge of and handle any property of FRWA,
18 assign and control activities of employees assigned to FRWA, and report to the FRWA
19 Executive Committee and FRWA Board. In my capacity as Program Manager, I am
20 familiar with the operation of the FRWA Intake and the effect of reverse flows on the
21 operation of the intake on behalf of SCWA. I have also previously served as the Chair of
22 the FRWA Operations and Maintenance Committee. Exhibit SCWA-32 contains a true
23 and correct copy of my resume.

24 II. PURPOSE AND SUMMARY OF TESTIMONY

25 This testimony relates to the Testimonies of Eileen White, Manager of Water
26 Operations, and Ben Bray, Senior Civil Engineer from EBMUD (See Exhibits EBMUD-
27 151, 152) and provides evidence illustrating the impacts to SCWA from reverse flow
28 events exceeding certain operational criteria at the FRWP intake that cause shutdown of

1 that facility. California Water Fix (WaterFix) project-related increases to potential reverse
2 flow events that may require shutdown of the FRWP intake cause project-related injuries
3 to SCWA, a legal user of water.

4 This testimony also provides notice that I contributed to the development of the
5 testimony of Michael E. Peterson, Exhibit SCWA-19.

6 III. FREEPORT REGIONAL WATER PROJECT

7 SCWA relies on the FRWP facilities to divert water from the Sacramento River to
8 provide surface water supplies and fulfill SCWA's conjunctive use program. The FRWP
9 facilities are designed to meet SCWA customer needs on a year-round basis. The
10 FRWP is a critical element in SCWA's water supply portfolio and represents a long-term,
11 significant investment by SCWA for surface supply capabilities and a robust conjunctive
12 use program.

13 FRWA and FRWP were a project born out of previous litigation regarding the
14 American River and dry year water supply contracts. In 1970, EBMUD executed a
15 Central Valley Project (CVP) water service contract with the United States Bureau of
16 Reclamation (USBR) for up to 150,000 acre-feet per year of water from the American
17 River delivered via the Folsom South Canal. A lawsuit filed in 1972 delayed construction
18 of necessary facilities. The litigation continued for almost two decades and concluded in
19 1990 when Judge Hodge of the Alameda County Superior Court affirmed EBMUD's right
20 to receive American River water through the Folsom South Canal while limiting
21 diversions during dry conditions to protect fishery resources. EBMUD, USBR, and
22 SCWA eventually agreed to move EBMUD's diversion point downstream to a location on
23 the Sacramento River near the town of Freeport. Accordingly, SCWA sought changes in
24 its water supply contracts and its appropriative right to include the FRWP as a point of
25 diversion. SCWA amended its CVP contract with USBR in 2001 authorizing delivery of
26 CVP water at the FRWP intake; around the same time, the FRWP intake was included
27 as a point of diversion for its appropriative water right.

1 In 2002, SCWA and EBMUD formed a joint powers authority, FRWA, to build and
2 operate the FRWP. The details of the formation of FRWA are documented in the Third
3 Amended Joint Powers Agreement Between Sacramento County Water Agency and
4 East Bay Municipal Utilities District (Third Amended JPA). Exhibit SCWA-12 contains a
5 true and correct copy of the Third Amended JPA. In addition to the Third Amended JPA,
6 the Agreement for Delivery of Water (Delivery Agreement) further defines FRWA's
7 responsibilities to deliver water to SCWA and EBMUD. Exhibit SCWA-33 contains a true
8 and correct copy of the Delivery Agreement. The FRWP was completed in 2011.
9 SCWA spent nearly \$500 million on its portion of the project, including its Vineyard
10 Surface Water Treatment Plant (VSWTP). The FRWP intake can divert 185 million
11 gallons per day (MGD), of which 85 MGD is dedicated to SCWA and 100 MGD to
12 EBMUD. As shown on Appendix A to Exhibit SCWA-39, which is a true and correct copy
13 of Agreement for Provision of Operation and Maintenance Services: The Freeport
14 Authority Intake and Pipeline (FRWA O&M Agreement), FRWA diverts water from the
15 Sacramento River and conveys it to the SCWA and EBMUD service areas using the
16 following facilities:

- 17 • A water intake/pumping plant located on the Sacramento River at the Freeport
- 18 bend
- 19 • An 84-inch joint pipeline from the river intake to the bifurcation point
- 20 • Bifurcation facility (isolation valve vaults, surge control, etc.)
- 21 • A flow control structure
- 22 • A 72-inch EBMUD extension pipeline from the bifurcation point to the Folsom
- 23 South Canal
- 24 • A 66-inch SCWA extension pipeline (Gerber Pipeline) from the bifurcation point to
- 25 SCWA's VSWTP
- 26 • A terminal weir structure, located at the intersection of the 72-inch EBMUD
- 27 extension pipeline and the Folsom South Canal
- 28

- A pipeline extending from the Folsom South Canal terminus to EBMUD's Mokelumne River Aqueducts

The river intake/pumping plant, 84-inch joint pipeline, bifurcation facility and flow control structure are owned by FRWA. The 72-inch EBMUD extension pipeline and terminal weir structure are solely owned by EBMUD. Similarly, the 66-inch SCWA extension pipeline is solely owned by SCWA.

The raw water intake and pumping facility is located on the Sacramento River at the Freeport Bend. Water is diverted from the river through fish screens and pumped into the raw water pipeline. This is the only pump station serving the joint pipeline. Eight identical vertical turbine raw water pumps are driven by four adjustable frequency drives to generate flows between 15 and 185 MGD. Each pump is rated for a nominal capacity of 26.5 MGD at 285 feet of head, and its 36-inch, above grade discharge head is connected to a 2,000 horsepower motor. The pumps draw Sacramento River water and send it through the 84-inch pipe to the bifurcation facility. At the bifurcation point, water can be directed towards the VSWTP or to EBMUD's turnout on the Folsom South Canal. From the bifurcation point, water serving SCWA is conveyed through the following facilities:

- Gerber Pipeline: The Gerber Pipeline is a 66-inch diameter cement mortar lined and welded steel pipe. The pipeline is located in Sacramento County and starts at the bifurcation area and extends north along a dedicated easement to the VSWTP, north of Florin Road.
- VSWTP: The VSWTP is a conventional treatment plant and includes flash mixing/coagulation, sedimentation, filtration, washwater recovery, and sludge dewatering facilities. The facility also includes a CT (concentration time) tank, clear well and chemical feed systems necessary to treat and distribute potable water.

The FRWA pumps can supply raw water to solely the VSWTP or the EBMUD bifurcation point, or to both facilities at the same time. Pump controls are utilized to

1 regulate pump discharge-based operator inputs: flow rate, destination, and start time.
2 Automatic controls are used to assess and address adverse river conditions, such as
3 tidally-influenced reverse and low flows. Under specific river conditions, the automatic
4 controls may drive a shutdown of the intake.

5 IV. SURFACE WATER RIGHTS USED AT FREEPORT

6 Over the last decade SCWA has invested in multiple sources of surface water to
7 divert through FRWA at the FRWP, to supplement groundwater and maintain a diverse
8 and reliable water supply portfolio for SCWA customers. Information about these
9 supplies is summarized in the following table, and more detailed information is provided
10 in the Testimony of Michael Peterson (Exhibit SCWA-19).

11 Contract/Water Right	12 Limitations	13 Maximum Diversion Amount
14 Permit 21209 – Appropriative Water Right	15 Subject to Term 91 Curtailment	16 71,000 acre-feet annually
17 CVP Contract No. 6-07-20-W1372 (Fazio)	18 Subject to USBR Shortage Policy	19 15,000 acre-feet annually
20 CVP Contract No. 14-06-200-5198B-IR2 (SMUD)	21 Subject to USBR Shortage Policy	22 30,000 acre-feet annually
23 Agreement between Sacramento County, SCWA, and Aerojet-General Corporation With Respect To Transfer of GET Water	24 Subject to operational disruptions	25 8,900 acre-feet annually

26 As summarized above, SCWA diverts water at the FRWP intake under an
27 appropriative water right, contract rights for Central Valley Project (CVP) water, and a
28 contract for delivery of remediated groundwater. SCWA's appropriative right, Permit
21209, entitles it to up to 71,000 acre-feet annually (afa) of water from the Sacramento
River, which can be diverted at a rate of 132 cubic feet per second. (Exhibit SCWA-20,
contains a true and correct copy of Permit No. 21209.) The priority date associated with
this right is June 13, 1995. (*Id.*)

1 SCWA has also entered into contracts with the Bureau of Reclamation (Bureau)
2 and other water users for water provided by the Central Valley Project (CVP). In 1999,
3 SCWA entered into a contract with the Bureau for 22,000 afa. (Exhibit SCWA-14,
4 contains a true and correct copy of Contract No. 6-07-20-W1372.) This contract is
5 known as the "Fazio Water" contract in recognition of Congressman Vic Fazio's efforts to
6 secure the contract. Of the 22,000 afa, 7,000 afa has been subcontracted to the City of
7 Folsom for diversion from Folsom Lake. Thus, 15,000 afa is available for SCWA to
8 divert from the Sacramento River. (Exhibit SCWA-15 contains a true and correct copy of
9 the CVP Subcontract with City of Folsom.) SCWA holds a second CVP contract
10 resulting from an assignment from the Sacramento Municipal Utility District (SMUD).
11 This CVP contract provides for delivery of 30,000 afa from the American River Division.
12 (Exhibits SCWA-16 and SCWA-17 are true and correct copies of CVP Contract Nos. 14-
13 06-200-5198B-IR1 and 14-06-200-5198B-IR2.) In total, these three rights
14 (appropriative and contract) entitle SCWA to divert up to 116,000 afa at the FRWP
15 intake.

16 SCWA has the right to receive a remediated groundwater supply of 8,900 afa in
17 accordance with the terms and conditions in the agreement entitled "Agreement between
18 Sacramento County, SCWA, and Aerojet-General Corporation With Respect To Transfer
19 of GET Water" dated May 18, 2010. This Agreement is based on groundwater
20 remediation activities conducted by Aerojet and Boeing/McDonnell Douglas in the
21 eastern portion of Sacramento County for extraction and treatment of contaminated
22 groundwater, and discharge of that water to surface streams including the American
23 River and its tributary waters. (Exhibit SCWA-28 contains a true and correct copy of the
24 SCWA-Aerojet Agreement.)

25 Due to Aerojet's obligations pursuant to regulatory orders and the terms of the
26 County-SCWA-Aerojet- General Agreement; SCWA planning assumptions include
27 receiving this 8,900 afa (calculated at the point(s) of discharge) for the foreseeable
28 future. This supply is diverted by SCWA from the Sacramento River at Freeport after it

1 is discharged into the American River or its tributaries. Aerojet supplies information on
2 the daily discharge rates from the remediation facilities into the American River or its
3 tributaries. SCWA accounts for a ten percent (10%) carriage loss at FRWP, and
4 historically has diverted its Aerojet water at an approximately constant daily rate of the
5 8,900 afa minus carriage loss averaged over a year. (See Exhibit SCWA-35, which is a
6 true and correct copy of SCWA's recent surface supply deliveries.) This amounts to a
7 diversion rate of approximately 8 MGD each day of the year. In all other respects,
8 SCWA diverts the Aerojet remediated groundwater in the same manner and at the same
9 time as SCWA's surface water supplies. However, when other SCWA surface supplies
10 are unavailable for diversion, SCWA continues to have the opportunity to divert Aerojet
11 water.

12 As discussed in the Testimony of Michael Peterson (Exhibit SCWA-19), SCWA
13 has developed a Water System Infrastructure Plan (Infrastructure Plan). The
14 Infrastructure Plan was first created in 2006, and was updated in 2016. The 2016
15 Infrastructure Plan is the most current staff-level water system planning tool. In sum, in
16 wet and average years, SCWA anticipates availability all of its 45,000 afa CVP contract
17 supplies, an additional 35,000 afa in appropriative right supplies, and 8,900 afa of
18 remediated groundwater supplies (less 10% carriage loss) for a total of approximately
19 88,900 afa of supply for diversion through the FRWP. (Exhibit SCWA-27 contains a true
20 and correct copy of Figure 4-5, 2016 Infrastructure Plan.) In both dry and critically dry
21 years, SCWA anticipates diverting water through the FRWP under its CVP and Aerojet
22 contract rights. In dry years, SCWA anticipates that water is unavailable under Permit
23 21209, but does anticipate having between 33,750 and 22,500 afa of CVP water for
24 diversion. (*Id.*) Additionally, SCWA anticipates having access to its Aerojet contract
25 water supply. In critically dry years, SCWA anticipates CVP supplies will be reduced to
26 approximately 22,500 afa and that it will have full access to its remediated groundwater
27 supply.

1 In years when appropriative supplies are unavailable to SCWA and CVP contract
2 water is restricted, SCWA anticipates relying heavily on the 8,900 afa (less carriage loss)
3 of remediated water for diversion at FRWP. This source of water is not subject to any
4 cutbacks or restrictions, aside from operational issues that may arise with the Aerojet
5 remediation facilities.

6
7 **V. OPERATIONAL CONSTRAINTS – REGULATORY REQUIREMENTS**
8 **IMPACTING FRWP**

9 The FRWP's location was chosen for its deep water, available land, and desirable
10 location downstream from the confluence with the American River. Most importantly, the
11 chosen site is located upstream of Sacramento Regional County Sanitation District's
12 ("Regional San") wastewater treatment plant discharge facility. The FRWA intake,
13 located at river mile 47.1, can be impacted by wastewater treatment plant discharges at
14 Sacramento River Mile 46. To ensure adequate water quality at the FRWP intake,
15 SCWA entered into a Coordinated Operations Agreement (COA) with Regional San.
16 The COA describes the coordination between FRWA, Regional San and SCWA. (See
17 Exhibit SCWA-37, which contains a true and correct copy of the COA.)

18 To prevent diversion of these discharges, the following operating requirement was
19 incorporated into the FRWA control strategies and into the permit issued by the State
20 Division of Drinking Water (DDW) (See Exhibit SCWA-36, which contains a true and
21 correct copy of SCWA's DDW permit):

- 22
- 23 • Diversions at FRWP cannot take place when treated effluent from the
24 Sacramento Regional Wastewater Treatment Plant (SRWTP) may be present in
25 the river at dilution ratio exceeding about 0.1%. The FRWA control system
26 calculates "particulate position" based on the velocity of the river (velocity x time =
27 distance). The pumps will shut down when the "particle" has traveled 0.9 miles
28 upstream of a flow sensor located between the FRWP Intake and the SRWTP

1 and can resume pumping when the "particle" has returned to 0.7 miles upstream
2 of the flow sensor located between the FRWP Intake and the SRWTP.

3 **VI. ANALYSIS OF REVERSE FLOW EVENT**
4 **SHUT DOWN IMPACTS TO SCWA**

5 Sacramento River conditions and flows may influence the trigger of operational
6 constraints, as described above, at the FRWP intake. These 'reverse flow events' may
7 result in FRWP shut downs that restrict SCWA's use of its surface water supplies, and
8 lead to extensive labor efforts cascading through the SCWA VSWTP to appropriately
9 shut down and restart the treatment process.

10 In connection with the agencies' FRWA partnership, EBMUD conducted an
11 extensive analysis of the California Water Fix (Water Fix) modeling being presented to
12 the State Water Resources Control Board (SWRCB), relative to the potential for reverse
13 flow event impacts to the FRWP intake. (See Exhibit EBMUD-152.) That analysis and
14 its conclusions identify WaterFix project-related increases in the frequency and duration
15 of reverse flow events in the Sacramento River that exceed the threshold criteria that
16 require the FRWP intake facility to temporarily cease water diversions. The analysis
17 concludes that implementation of the Cal WaterFix project will likely result in Sacramento
18 River flow reductions in low flow periods, and that these incremental flow reductions, as
19 compared to the No Action Alternative, result in more frequent reverse flow events that
20 meet or exceed FRWP intake shutdown criteria. Increases in FRWP intake shut down
21 events due to the WaterFix project would cause project-related injury to SCWA's use of
22 its available water supplies. When the FRWP intake is shut down, SCWA is unable to
23 divert its surface water supplies or contracted remediated groundwater.

24 WaterFix project-related significant reverse flow events potentially causing shut
25 down of the FRWP intake in years with significantly low flows on the Sacramento River
26 (typically occurring in dry year types) would affect SCWA's dry and critically dry year
27 surface water diversions generally limited to contractual supplies (i.e. a portion of
28 SCWA's CVP contract supply and Aerojet remediated groundwater). Significant reverse

1 flow events which cause shut down of the FRWP intake may require SCWA to shift to
2 using its groundwater supplies. These shifts to the use of groundwater from the South
3 American Subbasin could result in an unplanned use of groundwater that may disrupt
4 SCWA's conjunctive use plans for groundwater from the South American Subbasin.

5 Further, increased FRWP intake shut downs result in a loss of Aerojet remediated
6 groundwater flowing past the FRWP intake and unavailable for capture and return to
7 beneficial use in the South American Subbasin. Notwithstanding these additional losses
8 to the basin, because SCWA's historical daily Aerojet diversions have been limited to a
9 daily averaged amount of its full annual contract right, increased shut down events that
10 result in an inability to divert Aerojet water during the summer and fall months may cause
11 SCWA to be unable to make the most complete use of its annual Aerojet contract
12 amount after reverse flow event shut downs are over. Further, to the extent that SCWA
13 has built up its historical use of CVP water at build out, SCWA may lose the portion of its
14 dry-year CVP supply that might otherwise be available for its diversion during the time
15 that a similar shut down occurs.

16 Aside from the loss of water supplies that occur with each reverse flow incident,
17 SCWA staff is required to undertake significant operational procedures in order to
18 accommodate the shut down. In addition, upon a shut down of the FRWA intake there
19 are cascading effects to the SCWA downstream infrastructure. Portions of the VSWTP
20 related to the raw water supply must be shutdown including: raw water pumps, chemical
21 feed systems, filtration systems and wash water return systems. This includes isolating
22 associated valves, monitoring and disabling alarms and performing additional record
23 keeping. Once the shutdown event at the FRWP is complete similar start up procedures
24 would be undertaken to bring the VSWTP back online

25 Aside from the actual shut down and restart process and its attendant labor and
26 mechanical expense, operational planning for shut downs of the system create another
27 burden. WaterFix project related increases in shut downs of the FRWP intake and
28 SCWA's VSWTP facilities may require change or retooling of the operations or supply

1 plans during a dry year or dry periods to accommodate the increased operational and
2 supply uncertainty. In addition to the additional staff time required to perform the shut
3 down and restart process, essentially trained staff —on duty or on-call—must respond
4 during reverse flow events, requiring an increased dedication of labor during such times.

5 VII. CONCLUSION

6 Reverse flow events requiring the shutdown of the FRWP intake cause
7 consequential effects to downstream SCWA treatment and distribution facilities, resulting
8 in increased labor and planning requirements. These events impact SCWA's use of
9 surface water supply and thereby may also affect SCWA's implementation of its
10 conjunctive use program, SCWA's use of groundwater, and SCWA's ability to return
11 remediated groundwater back to beneficial use in the subbasin of its service area. In dry
12 periods of dry and critically dry years, reverse flow events causing FRWP intake shut
13 downs prevent SCWA from using its available CVP allocation and Aerojet remediated
14 groundwater contract supply. WaterFix project-related increases in reverse flow events
15 causing FRWP intake shut downs would result in project-related injuries to SCWA
16 operations and use of its water supplies.

17 I declare under penalty of perjury under the laws of the State of California that the
18 facts recited above are true and correct. Executed on this 31st day of August 2016 in
19 Sacramento, California.

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21 Forrest W. Williams, Jr.
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