JEANNE M. ZOLEZZI, SBN: 121282
KARNA E. HARRIGFELD, SBN: 162824
JANELLE KRATTIGER, SBN: 299076
HERUM\CRABTREE\SUNTAG
A California Professional Corporation
5757 Pacific Avenue, Suite 222
Stockton, CA 95207
Telephone: (209) 472-7700

Attorneys for THE WEST SIDE IRRIGATION DISTRICT

BEFORE THE STATE WATER RESOURCES CONTROL BOARD

ENFORCEMENT ACTION ENFO1949 DRAFT CEASE AND DESIST ORDER REGARDING UNAUTHORIZED DIVERSIONS OR THREATENED UNAUTHORIZED DIVERSIONS OF WATER FROM OLD RIVER IN SAN JOAQUIN COUNTY	**REBUTTAL TESTIMONY OF SUSAN C. PAULSEN** Hearing Date: March 21, 2016 Hearing Officer: Frances Spivy-Weber

1. I, Susan C. Paulsen, declare that I submit this written testimony at the request of counsel for: (1) Byron-Bethany Irrigation District (BBID) in Enforcement Matter No. 01951 (ENF01951); and (2) West Side Irrigation District (WSID) in Enforcement Matter No. 01949 (ENF01949). ENF01951 and ENF01949 (collectively, Enforcement Proceedings) are pending before the State Water Resources Control Board (SWRCB).

2. I was retained by counsel for BBID and WSID as an expert in the Enforcement Proceedings to: (1) describe flow and salinity conditions within the Sacramento-San Joaquin River Delta (Delta) over time; (2) review the historical diversion practices of BBID and WSID; (3) analyze the "availability" of water to satisfy BBID's intake demands in June 2015 according to its pre-1914 appropriative water rights; (4) analyze the "availability" of water to satisfy WSID intake demands through the irrigation season according to its post-1914 appropriative water rights. As used herein, the term "availability" refers to both the quantity and quality of water available for diversion.

3. My qualifications have been previously provided in EXHIBIT BBID-384.

4. To perform the analysis discussed in this rebuttal opinion, I evaluated the following information:

a. Information detailed in my prior testimony (EXHIBIT BBID-388) and in the Exponent Report (EXHIBIT BBID-384).

b. The testimony of Kathy Mrowka (EXHIBIT WR-7).

c. Historical documents related to the application and license of the WSID.

5. In her testimony (EXHIBIT WR-7 at pp. 12-13), Ms. Mrowka appears to distinguish between "unconstrained Delta tidal flows" (or "Delta tidal flows") and "the waters of Old River." Although it is unclear to me what is meant by this distinction, it appears that Ms. Mrowka may be inferring that "Delta tidal flows" may include some component of water that enters the Delta from San Francisco Bay, as her testimony distinguishes between "lower quality tidal waters" and "fresher, higher quality Old River water" (WR-7 at p. 13). Ms. Mrowka also states that, "inasmuch as the point of diversion is subject to tidal influence, the right holder was subject to some expense or inconvenience associated with the approximate 4 foot change in water height associated with the tides and resultant fluctuations in water quality," implying again that Ms. Mrowka believes that water that is subject to tidal forcing is of poorer quality than water that is not influenced by tidal forcing.

6. However, in my opinion, such a distinction does not make sense in most areas of the Delta. Delta channels are below sea level, and thus water is always present within the Delta. Tidal variations in stage and bi-directional ("sloshing") flows occur throughout the Delta. Tidal influences are strongest in the western portion of the Delta, where Delta outflows enter San Francisco Bay, but tidal influences extend throughout the Delta. During dry conditions, bi-directional flows occur at the upper extent of the Delta (e.g., in the Sacramento River at the I Street Bridge in Sacramento, and in the San Joaquin River at the Mossdale Bridge). However, these bi-directional flows are caused by tidal forcing at the seaward boundary of the Delta, and do not indicate that Bay waters travel to the upper extent of the Delta.

7. In fact, flow reversals caused by tidal forcing do not mean that salinity from the Bay is present throughout the Delta. For example, even though the Sacramento River at Freeport

experiences frequent "flow reversals" during periods of low daily average river flow, the Sacramento River remains a freshwater river at this location year-round. Similarly, the San Joaquin River where it enters the Delta near the Mossdale Bridge remains a freshwater river, even when tidal forcing causes fluctuations in stage of several feet. The historical record shows that only rarely did high salinity waters reach the WSID diversion location in the south Delta. Only once, during September 1931, was a threshold of 1,000 mg/L chloride reached at the location of WSID's intake. See EXHIBIT BBID-384.

8. In EXHIBIT BBID-384 and BBID-388, I used the DSM2 model to simulate flows and salinity within the Delta, and to simulate "source fingerprints" that were used to evaluate the source of water present at the WSID intake. Prior to development and implementation of the State Water Project (SWP) and the Central Valley Project (CVP) (collectively, the Projects), the sources of water at the WSID intake in the summer and fall of critically dry years (including 1931) primarily comprised as much as 50% Sacramento River water with most of the balance from agricultural runoff (up to 40%) and, during the late summer and fall months, flows from Martinez (up to about 25%; water from Martinez would have contained a component of water from San Francisco Bay), and small contributions (<5%) from the San Joaquin River and east-side streams. During winter and early spring, water at the WSID intake comprised as much as 90% San Joaquin River water. Post implementation of the Projects, Sacramento River water now comprises about 50% to 80% of the water at the WSID intake during late spring through fall of dry years, with agricultural runoff (up to about 25%) and water from the east-side streams (about 10%), plus a small amount (a few %) of water from Martinez comprising the balance. Thus, during summer and fall of critically dry years, the Sacramento River is the largest single source of water at the WSID intake, while during the winter through spring, the San Joaquin River is the dominant water source at the WSID intake; note that agricultural runoff consists of the return flows of water diverted from Delta channels, and so would reflect the composition of the water diverted for irrigation.

9. The fact that Sacramento River water is present in the South Delta, including in Old River, is well established. The Department of Public Works, predecessor to DWR, confirmed in

the 1929 Bulletin 21 that WSID "pumps water from Old River, a branch of the San Joaquin River." DWR stated that "[t]he water in San Joaquin River is largely return flow from diversions farther upstream and water reaching the Delta from Sacramento River through Georgiana Slough and other inter-delta channels" I obtained a copy of the report from the Department of Water Resources ("**DWR**"), the successor of the Department of Public Works. DWR posts historic reports on its website at http://www.water.ca.gov/waterdatalibrary/docs/historic/bulletins.cfm. A true and correct copy of Department of Public Works Bulletin No. 21 dated 1929 is identified as **EXHIBIT WSID0006**, see pages 156-158 (pdf pages 170-172).

10. The water in Old River flows into Old River from several sources, including the Sacramento River, the San Joaquin River, agricultural return flows, and the east-side streams. Old River is the name given to the channel that conveys water from these various sources; Old River does not itself have an extensive watershed, such that the water in Old River can be said to be comprised of "Old River water." Rather, it has long been recognized that "Old River water" is actually water that enters the Delta from other locations, including the Sacramento River.

11. The Department of Public Works (predecessor to DWR) confirmed in an October 9, 1933, letter that WSID's rights of appropriation initiated on April 17, 1916. The amount of water named in the license was established as "the maximum amount found to have been put to beneficial use in the years 1930, 1931 and 1932 as shown by the Sacramento San Joaquin Water Supervisor's records" (DPW 1933). A true and correct copy of the October 9, 1933 letter is provided as **EXHIBIT WSID0007**. A true and correct copy of Table 38 of the Sacramento San Joaquin Water Supervisor's Report, Department of Public Works Bulletin No. 23, dated August 1932, is provided as **EXHIBIT WSID0008**. I obtained a copy of the Water Supervisor's Report from DWR's website at http://www.water.ca.gov/waterdatalibrary/docs/historic/bulletins.cfm.

12. I have also reviewed additional documentation related to WSID's water right, including a May 8, 1917 letter "In re Application of West Side Irrigation District, No. 301" (EXHIBIT WR-175); and a July 24, 1917 letter advising WSID that its application to appropriate "the waters of Old River, San Joaquin County" had been filed (EXHIBIT WR-176). None of the early documentation that I have reviewed makes any distinction between the "waters of Old River"

and flow from any other source, including "tidal flows." For the reasons set forth above, the "waters of Old River" necessarily include water from the Sacramento River, the San Joaquin River, and agricultural return flows.

13. Based on the information provided above, and information presented the Exponent report and in my prior testimony, I conclude that:

a. "Old River water" comprises water that entered the Delta from the Sacramento River, the San Joaquin River, agricultural return flows, east-side streams, and water from Martinez.

b. "Old River water" has historically been fresh water (not saline water), even during historical conditions prior to the construction and operation of the Projects. Only once in the historical record (in September 1931) has salinity from the Bay intruded into the Delta to such an extent that chloride levels reached 1000 mg/L at the location of the WSID intake, and even at that time WSID continued to divert water from that source.

c. Although the South Delta is influenced by the tides such that water levels rise and fall as a result of tidal forcing, and such that flow at times "sloshes" back and forth as a result of tidal forcing, this does not indicate that saltier Bay water is present. The effects of tidal forcing are felt throughout the Delta, particularly during dry conditions, even though water at the upper extent of the Delta and in most Delta channels remains fresh.

d. The historical record indicates that the rights and license of the WSID were determined using information characterizing WSID's pumping practices in the years of 1930, 1931, and 1932, and that WSID pumped water from its intake throughout the irrigation seasons of those years. The historical record indicates that WSID has rights to appropriate "the waters of Old River," and the historical record does not, to my knowledge, discuss or exclude from that right "Delta tidal flows" or "unconstrained Delta tidal flows."

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

Executed this 19th day of February, 2016, in Pasadena, California.

SUSAN C. PAULSEN