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BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

ENFORCEMENT ACTION ENF01949 - DRAFT CEASE AND DESIST ORDER REGARDING UNAUTHORIZED OR THREATENED UNAUTHORIZED DIVERSIONS OF WATER FROM OLD RIVER IN SAN JOAQUIN

In the Matter of ENFORCEMENT ACTION ENF01951 -ADMINISTRATIVE CIVIL LIABILITY COMPLAINT REGARDING UNAUTHORIZED DIVERSION OF WATER FROM THE INTAKE CHANNEL TO THE BANKS PUMPING PLANT (FORMERLY ITALIAN SLOUGH) IN CONTRA COSTA COUNTY

REBUTTAL TESTIMONY OF PAUL HUTTON

I, Paul Hutton, declare:

1. I submit this written rebuttal testimony on behalf of the State Water Contractors ("SWC") in the following proceedings: 1) Westside Irrigation District Enforcement Matter No. 01949(ENF1949); and 2) Byron-Bethany Irrigation District Enforcement Matter No. 01951 (ENF1951).

2. If called as a witness, I can and would testify to the following facts, analyses, findings and conclusions stated herein, and to the information contained in Exhibits SWC0002, SWC0003, SWC0004, SWC0005, SWC0006, and WSID0008, pp.198, 200, 202, 205-207, which is incorporated by reference as part of my written testimony.

BACKGROUND AND QUALIFICATIONS

3. I am currently the Principal Engineer for the Bay-Delta Initiatives at Metropolitan Water District of Southern California ("MWD"). In that position, which I have held since 2002, I work collaboratively with interagency and interdisciplinary teams to provide policy-level decision support for MWD's ongoing water management, regulatory and legal activities in the areas of Sacramento-San Joaquin Delta ("Delta") hydrodynamics and water quality as well as Central Valley Project ("CVP") and State Water Project ("SWP") operations.

4. Prior to joining MWD I held several positions at the Department of Water Resources ("DWR") from 1990 to 2002. My last position with DWR was the supervising engineer and program manager of the Delta Modeling Section with a staff of seventeen engineers responsible for developing and applying various water quality, hydrodynamic and biological models. In addition, I was the program manager responsible for developing actions and studies for implementing CALFED's Drinking Water Improvement Strategy and managing DWR's Statewide Planning Program, which involved developing and implementing policies related to the California Water Plan Update (Bulletin 160-98). My previous experience is summarized in my C.V. at exhibit SWC0002.

5. I am a registered civil engineer in California and my license number is C040795.

6. I have a B.S. in Civil Engineering and graduated with highest honors from the University of Illinois, Urbana in May 1983.

7. I obtained a M.S. in Environmental Engineering from University of Illinois, Urbana in January of 1985.

8. I obtained a Ph.D. in Civil and Environmental Engineering from the University of California, Davis in December 1994.

9. I have been working on Delta issues for 25 years. I have published several papers on hydrodynamics and water quality in the Delta. For a complete list of my publications please see exhibit SWC0002.

10. In 1994, I received the American Society of Civil Engineers Water Resources Planning and Management Division Outstanding Journal Paper Award.

11. In 2006, I received the Hugo B. Fischer Award from the California Water and Environmental Modeling Forum in recognition of model development and application in support of the San Joaquin River Salinity Management Plan.

12. My job duties include working with the SWC and directing work on behalf of MWD or in coordination with SWC. As part of my job duties I assisted in the development of an analysis of without project salinity conditions in the Delta (2012-2015). I completed a comparative analysis of Delta outflow and salinity in 1931 (historical scenario) and 2015 (without project scenario). I was also directed to review the technical report by Susan Paulsen (BBID384), the testimony of Susan Paulsen (BBID388), the testimony of Thomas Burke (WSID0123), and the following Department of Public Works Documents: Bulletin 27 (SWC0004) and Bulletin 23 (1931) (WSID0008, pp. 198, 200, 202, 205-207).

SUMMARY OF WORK COMPLETED

13. I assisted in directing a CH2M Hill analysis of salinity conditions; the technical report is attached as exhibit SWC0005. The purpose of this study was to analyze salinity conditions in the south Delta channels under a "without project" scenario based on historical hydrology spanning the period January 1, 2012 to August 31, 2015. The without project scenario modifies the historical hydrology by removing (1) upstream impairments associated with CVP and SWP reservoirs, (2) Delta diversions at the Banks and Jones Pumping Plants, and (3) the Delta Cross Channel facility. The multi-year timeframe allows understanding of Delta salinity conditions under a sequence of

differing hydrologic conditions. A complete description of the methods and data used in the analysis are described in the CH2M Hill technical appendix attached as exhibit SWC0005.

14. I completed a scenario analysis of irrigation season Delta outflow and salinity comparing 1931 (historical) and 2015 (without project). The attached figure (SWC0003) compares monthly average outflow and salinity (as measured by X2 position) for the two scenarios. The source of the 1931 outflow data is DAYFLOW. The source of the 1931 salinity data is Hutton et al. (2015) "Nine Decades of Salinity Observations in the San Francisco Bay and Delta: Modeling and Trend Evaluation." *J. Water Resour. Plng. Mgmt.*, DOI: 10.1061/(ASCE)WR.1943-5452.0000617 (available at: http://ascelibrary.org/doi/abs/10.1061/%28ASCE%29WR.1943-5452.0000617). The source of the 2015 scenario outflow and salinity data is described in exhibit SWC0005.

15. In the figure "Comparison of Delta Outflow and Salinity," exhibit SWC0003, month is shown on the horizontal axis, Delta outflow (in units of cubic feet per second) is shown on the left-side vertical axis, and X2 position (in units of kilometers) is shown on the right-side vertical axis. In the same figure, the blue and black bars represent April through August Delta outflow in the 2015 and 1931scenarios, respectively. In the same figure, the blue and black lines represent April through August X2 in the 2015 and 1931 scenarios, respectively. X2 is used as an indicator of salinity intrusion into the Delta.

16. As part of my work on this matter, I was directed to review the technical report of Susan Paulsen (BBID384), the testimony of Susan Paulsen (BBID388), the testimony of Thomas Burke (WSID0123), and portions of Bulletin 27 (SWC0004) and Bulletin 23 (1931) (WSID0008). Bulletin 27 (SWC0004) is a true and correct copy that was obtained from DWR by the SWC. Bulletin 27 is also available on the internet at http://www.water.ca.gov/waterdatalibrary/docs/historic/Bulletins/Bulletin_27/Bulletin_27__1931.pdf.

SUMMARY OF FINDINGS

17. The CH2M Hill analysis, as described in exhibit SWC0005, concluded that salinity would typically be much higher in the Delta absent the CVP and SWP relative to historical conditions. The analysis further concluded that, absent the CVP and SWP, salinity (measured as

specific conductance) would be above 1.0 mS/cm during the irrigation season of many dry and critically dry years.

18. As part of my job duties, I monitor SWP and CVP compliance with the State Water Resources Control Board's ("Water Board") Bay-Delta Water Quality Control Plan ("WQCP") standards. In 2015, DWR and the Bureau of Reclamation ("Reclamation") continued to satisfy WQCP regulatory obligations, including those modified by the Water Board's orders regarding the DWR and Reclamation temporary urgency change petition ("TUCP"). The Water Board's 2015 TUCP orders relaxed certain WQCP standards and limited SWP and CVP project pumping during the irrigation season to health and safety levels. Throughout the irrigation season, the SWP and CVP continued to make releases from upstream reservoirs to satisfy WQCP standards. DWR also installed a salinity barrier at West False River from June to September 2015 for the purpose of blocking salinity intrusion into the Delta from the ocean.

19. Unauthorized diversions of SWP stored water released for the purpose of satisfying WQCP and other regulatory obligations and/or for diversion by the SWP impact the SWC member agencies as the contractual beneficiaries of the SWP. These unauthorized diversions cause the SWP to make additional stored water releases or to reduce exports to satisfy WQCP and other regulatory requirements, thereby decreasing the stored water supplies of the SWP available to SWC member agencies. In 2014, DWR and Reclamation sent a joint letter stating "Where water quality standards are controlling Water Project Operations, any diversion of stored water by these diverters results in additional releases of stored water or reductions in Project deliveries…" This letter is exhibit SWC0007. This occurred in 2014 as indicated in exhibit SWC0007 and also occurred in 2015.

20. My comparison of the 2015 and 1931 scenarios as illustrated in exhibit SWC0003 indicate that historical outflow during the irrigation season (April through August) of 1931 is consistently higher than without project outflow during the irrigation season of 2015. Outflow in 1931 ranged from approximately -3,000 cfs to 7,500 cfs, whereas without project outflow in 2015 ranged from approximately -3,900 cfs to 6,400 cfs.

21. As also shown in exhibit SWC0003, historical salinity during the irrigation season (April through August) of 1931 is consistently lower than without project salinity during the

irrigation season of 2015. Salinity in 1931 (as measured by X2 position) ranged from approximately 76 km to 122 km, whereas without project X2 position in 2015 ranged from approximately 83 km to 137 km.

22. Although there are similarities between 1931 and 2015 with respect to annual unimpaired runoff conditions and water year type, the Delta conditions of 1931 poorly represent those associated with 2015 absent the CVP and SWP. Due to less upstream development (water use) in 1931, irrigation season outflow was significantly higher and salinity was significantly lower) relative to the 2015 without project scenario.

23. The 1931 baseline assumption in Susan Paulsen's modeling (BBID384) is inappropriate. The technical report by Susan Paulsen (BBID384) selected the pre-project year 1931 as a surrogate for 2015 without project conditions. Her assumption is inappropriate because, as exhibit SWC0003 illustrates, 1931 experienced higher outflows and lower salinity than would have occurred in 2015 absent the CVP and SWP. The primary reason for the differences between 1931 and 2015 (without project) is because upstream development was lower in 1931 than in 2015.

24. Susan Paulsen's analysis (BBID384) is also inappropriate because she fails to remove SWP and CVP operations and facilities from the modeling of 2015 salinity and flow patterns. To the extent that Susan Paulsen is using her 2015 modeling results to define the quantity and source of water available to WSID and BBID in that year, her baseline is flawed because WSID and BBID do not have a right to stored water supplies based on their senior water rights.

25. Susan Paulsen's analysis (BBID384) also fails to acknowledge that the combined effect of all diversions in the Delta is to change flow patterns and to draw Sacramento River water into the south Delta.

26. Westside Irrigation District (WSID) references Bulletin 23 (1931) (WSID0008), Table 39, as evidence of the District's diversions in 1931. To the extent diversions occurred in 1931 by WSID and others, the same report analyzes the damage that 1931 diversions of high salinity water caused to crops and the soil. The report at p. 198 explains that:

> Since the beginning of salinity observations in the Sacramento-San Joaquin Delta it has been recognized that in years of deficient Spring

> and Summer stream flow to the Delta, the resulting extensive encroachment of salinity from San Francisco Bay has caused damaged in the Delta. In 1930, 1924, and 1926, but particularly in 1924, the magnitude of the encroachment was such as to leave no doubt that damage must have been sustained…In the Spring of 1931 it was plainly evident that the stream flow to the Delta would probably be as low if not lower than it was in 1924 and that a salinity encroachment as great if not greater than in that year could be expected.

27. Bulletin 23 (WSID0008) quantified the economic impacts resulting from the salinity intrusion into the Delta in 1931. The report at p. 200 describes the reasons for the damage and resulting economic losses, as follows:

> Under tangible losses is classed [as] the actual loss in production of crops in 1931 due to (1) the curtailment of irrigation when the salinity of the irrigation water became too high, (2) the actual application of irrigation water of too high salinity, and (3) the abandonment of a crop, or plans for it, because of high salinity.

28. Bulletin 23 (WSID0008) quantified the economic impacts at p. 202, Table 92, stating that the resulting economic losses caused by salinity encroachment into the Delta during the irrigation season of 1931 totaled $1,263,716.

29. Bulletin 23 (WSID0008) at pp. 205-207 also describes a range of intangible injury to crops caused by salinity encroachment into the Delta during the irrigation season in 1931, injury that included agricultural soils, levees, and native vegetation.

30. Bulletin 27 (SWC0004) also describes the salinity conditions that existed in the Delta in 1931 and other dry and critically dry years. Bulletin 27 explains that:

> Beginning in 1917, there has been an almost unbroken succession of subnormal years of precipitation and stream flow which, in combination with increased irrigation and storage diversions from the upper Sacramento and San Joaquin River system, has resulted in a degree and extent of saline invasion greater than has occurred ever before as far as known. These abnormal saline invasions not only have curtailed irrigation diversions and affected crop production and land values in the delta also have reduced considerably the diversions of fresh-water supplies from the lower river and upper bay…. (SWC0004, p. 15.)

And:

> The greater degree and extent of saline invasion in certain years since 1917 have resulted in curtailment of irrigation diversions for a portion of the delta and upland area. (SWC0004, p. 20.)

And:

> During several years in the period 1920 to 1929, the inflow into the delta during the summer months has been insufficient to take care of the consumptive requirements. (SWC0004, p.32.)

And:

> On the other hand, in years when the stream flow into the delta during the summer months was insufficient to meet the consumptive demands in the delta, invasions of saline water of considerable extent and degree have occurred. This was especially true in the dry years of 1924, 1920 and 1926, when stream flow was insufficient to meet consumptive demands for a considerable period of time. (SWC0004, p. 36.)

CONCLUSION

31. Contrary to the conclusion of Susan Paulsen, the 1931 historical scenario poorly represents the 2015 without project scenario. In 1931, salinity conditions would have been more favorable than 2015 (without project), with higher outflow and lower salinity resulting from lesser upstream water development.

32. While agricultural diverters in the Delta may have diverted water in 1931, they also experienced crop damage, curtailed diversions and abandoned crops in the field, while also experiencing more intangible salinity damage to agricultural soils (and subsequent crops), levees and native vegetation. The cost of the salinity damage experienced by farmers in the Delta in 1931 was estimated to be $1,263,716.

33. Absent the SWP and CVP, salinity in the south Delta would typically exceed 1.0 mS/cm specific conductance during the irrigation season of dry and critically dry years, which is higher than the current irrigation season WQCP agricultural salinity standard of 0.7 mS/cm. This suggests that water quality would be too poor to support agricultural use during summer and fall of dry and critically dry years if the SWP and CVP did not exist.

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

Executed this 22nd day of February, 2016, in Sacramento, California.

PAUL HUTTON, Ph.D., P.E.