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M E M O R A N D U M

TO: Tim O'Laughlin

FROM: Daniel B. Steiner

SUBJECT: San Joaquin River Basin Operations – Goodwin "No Relax" Simulation

DATE: May 11, 2005

During the State Water Resources Control Board's March workshop I presented the results of CALSIM simulations for two primary studies: "Current Conditions", representing a depiction of current San Joaquin River Basin operations, including the operation of New Melones to its Interim Plan of Operations (IPO); and, "Alternative Water Quality Objective", representing similar operations and hydrology except that the water quality objective at Vernalis is assumed to be 1,000 uS/cm year-round.[1] As described during the workshop, during the summer months the release from Goodwin to the Stanislaus River needed to achieve water quality compliance at Vernalis and dissolved oxygen compliance at Ripon is about the same; therefore, a change to the water quality objective at Vernalis during June through August would not result in a large, regular change in release from New Melones nor a great change in the summer-time flow or quality at Vernalis. To identify greater potential flow and quality changes at Vernalis due to the assumed change in water quality objectives a modification to the assumed minimum flow requirements for the Stanislaus River was made, with the surrogate release for dissolved oxygen compliance relaxed to 100 cfs. Results from that scenario were the emphasis of the presentation at the workshop and included in the accompanying written presentation. This memorandum presents additional information concerning a study that does not assume the relaxation of the surrogate release for dissolved oxygen at Ripon. The results of this study (referred to as the "No Relax" simulation) were also displayed at the workshop, and are shown in Figure 1.

Several objectives for the release at Goodwin are modeled by CALSIM, one of which is the release necessary to comply with the dissolved oxygen objective at Ripon. Although complied with by day-to-day river operations based on real-time monitoring, CALSIM incorporates a monthly flow surrogate for the required flow. This surrogate is shown in Table 1.

Table 1: Goodwin Flow Surrogate for Dissolved Oxygen Compliance at Ripon

Month	Release (1,000 acre-feet / cfs)
June	13.2 / 222
July	16.2 / 263
August	16.4 / 267
September	14.3 / 240

For the "Alternative Water Quality Objective" scenario described at the workshop, the release requirement was relaxed to 100 cfs for each month of the study. For the "No Relax" scenario, assumptions of the "Current Conditions" scenario including the dissolved oxygen flow release

[1] Refer to "Presentation of Daniel B. Steiner Concerning San Joaquin River Hydrology and Alternative Flow and Quality Objectives at Vernalis", March 2005, for a complete description of the studies, including the reduction of instream Stanislaus River flow constraints within the "Alternative Water Quality Objective" scenario.

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surrogate remained the same, and only the alternative water quality objective at Vernalis (1,000 uS/cm year-round) is changed.

In Figure 1 the results of the No Relax scenario are contrast against the results of the Alternative Water Quality Objective scenario. The results illustrate the average change (compared to Current Conditions) in Vernalis flow, by year type, anticipated with the assumed change in water quality objective at Vernalis. The results are shown for the each month of the year and the non-pulse periods of April and May. With no relaxation of the current Stanislaus River operational objectives (e.g., dissolved oxygen at Ripon), CALSIM projects little flow difference at Vernalis during the months June through September if the water quality objective at Vernalis is modified as assumed.

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Simulated Flow Change at Vernalis

With 1,000 uS/cm Year-round Objective and Summer Goodwin DO Release Relaxed to 100 cfs

Average Vernalis Flow (non-pulse) within Year Type - cfs							Alternative Water Quality Objective Scenario					
SJRBI	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
W	2726	2666	3831	7315	12991	14586	11624	9986	10908	7622	3499	3954
AN	2750	3297	5384	5865	6119	5791	4739	3675	2746	2192	1803	2324
BN	2431	2343	2545	2750	2993	3064	2554	2513	2033	1500	1379	1885
D	2826	2484	2417	2378	2690	2510	1837	1875	1463	1192	1276	1807
C	2183	2219	1973	1752	2192	1854	1150	1220	923	752	877	1382
All	2578	2609	3297	4323	6111	6395	5042	4404	4272	3100	1916	2414

Change in Vernalis Flows within Year Type - cfs							Alternative Water Quality Objective Scenario					
SJRBI	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
W	32	8	8	15	61	15	35	21	32	43	-14	31
AN	8	3	87	-3	24	86	72	59	-12	-31	-20	-23
BN	2	5	5	4	3	2	-12	23	-36	-62	-64	-45
D	3	6	6	4	-1	0	-93	-76	-57	-96	-94	-68
C	3	3	3	3	75	1	-220	-177	-156	-166	-161	-134
All	12	5	21	5	38	21	-41	-29	-42	-55	-68	-43

With 1,000 uS/cm Year-round Objective and No Relaxation of Goodwin DO Release

Average Vernalis Flow (non-pulse) within Year Type - cfs							Alternative Water Quality Objective Scenario w/ No Relax					
SJRBI	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
W	2710	2659	3824	7301	12945	14580	11596	9959	10876	7592	3513	3936
AN	2744	3296	5326	5875	6110	5707	4673	3620	2759	2224	1827	2347
BN	2429	2340	2541	2747	2991	3063	2507	2466	2068	1562	1443	1931
D	2824	2479	2411	2375	2691	2510	1836	1873	1516	1281	1370	1875
C	2181	2216	1970	1750	2191	1853	1142	1213	1039	909	1037	1516
All	2572	2605	3282	4320	6096	6377	5012	4376	4305	3156	1984	2461

Change in Vernalis Flows within Year Type - cfs							Alternative Water Quality Objective Scenario w/ No Relax					
SJRBI	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
W	16	1	1	1	15	9	7	-6	1	13	0	13
AN	2	2	30	7	15	2	6	5	0	0	4	0
BN	1	1	1	1	0	1	-58	-24	-1	0	0	0
D	1	1	1	1	0	0	-94	-78	-4	-7	0	0
C	1	1	1	1	73	0	-227	-184	-40	-8	0	0
All	5	1	6	2	23	3	-70	-57	-9	1	1	4

Figure 1