

~~EII-PORGANS-104~~ JCOX Carriage Water Requirements

PORGANS-319

December 27, 1984

Jerry Cox

Francis Chung/Sina Darabzand  
Hydrology and Water Operations  
Section

North Delta Water Agency (NDWA) Contract Outflow

Per your request, two nine-year operation studies were conducted and are summarized in the attached tables. Aside from the assumptions common in our 1990 level operation studies such as 1990-USCE-18, the following three features are specially designed for the NDWA contract outflow computation.

1. In October, November and December, use previous water year's Four Basin Index for the table look-up (upper-left graph in Attachment A, NDWA Contract).
2. Raise D-1485 minimum fish flow requirements from 2,500 cfs to 3,000 cfs.
3. Activate the outflow relaxation during December and January if Oroville storage in the beginning of each month becomes less than 2.0 MAF. In our previous runs, imposition of deficiencies activated the outflow relaxation.

As in our previous runs, 3.0 MAF of SWP normal annual delivery is used as the base. For documentation purpose, the two studies are named as follows:

<u>Study I. D.</u>	<u>Description</u>
27A	With NDWA Contract Outflow
27B	Without NDWA Contract Outflow

Table B shows the water year deliveries for the nine-year period. This delivery pattern is used for both studies causing the differences in the October 1935 storages presented in Table C. Due to the additional outflow requirements shown in Table F, ending storages (Table C) in Study 27A are lower. Reduction in surplus Delta outflow (Table G) in Study 27A compensates somewhat for the additional outflow requirements. This is not our normal mode of operation studies. Nonetheless, it was necessary because of the high normal SWP demand of 3.0 MAF.

Attachments

cc: Carl Winkler, with attachment  
Jerry Vayder, without attachment  
Sushil Arora " " " "  
Ed Winkler " " " "

FChung/SDarabzand:br  
(TXFWS-SINAER)

TABLE A  
PROJECT TARGET DELIVERIES WITH PERMANENT SUISUN MARSH  
D-1485 STANDARDS  
(TAF/Yr.)

Study	SWP Base Delivery	CVP Base Delivery
27A	3000.3	3167.0
27B	3000.3	3167.0

TABLE B  
ANNUAL DELIVERIES  
(TAF)

WATER YEAR	SWP		CVP
	Deliveries <sup>1/</sup>	Shortages Below 3.0 MAF	Deliveries <sup>2/</sup>
1927	3,000	0	3,167
1928	2,782	218	3,167
1929	2,733	267	2,561
1930	2,593	407	3,057
1931	1,993	1,007	2,561
1932	1,590	1,410	3,057
1933	1,529	1,471	2,561
1934	1,529	1,471	2,451
1935	2,563	437	3,057

<sup>1/</sup> SWP Deliveries = N. Bay + S. Bay + SWP Dos Amigos Deliveries.

<sup>2/</sup> CVP Deliveries = C.C.C. + D.M.C. + San Felipe + CVP San Luis Deliveries.

TABLE A  
PROJECT TARGET DELIVERIES WITH PERMANENT SUISUN MARSH  
D-1485 STANDARDS  
(TAF/Yr.)

Study	SWP Base Delivery	CVP Base Delivery
27A	3000.3	3167.0
27B	3000.3	3167.0

TABLE B  
ANNUAL DELIVERIES  
(TAF)

WATER YEAR	SWP		CVP
	Deliveries <sup>1/</sup>	Shortages Below 3.0 MAF	Deliveries <sup>2/</sup>
1927	3,000	0	3,167
1928	2,782	218	3,167
1929	2,733	267	2,561
1930	2,593	407	3,057
1931	1,993	1,007	2,561
1932	1,590	1,410	3,057
1933	1,529	1,471	2,561
1934	1,529	1,471	2,451
1935	2,563	437	3,057

<sup>1/</sup> SWP Deliveries = N. Bay + S. Bay + SWP Dos Amigos Deliveries.

<sup>2/</sup> CVP Deliveries = C.C.C. + D.M.C. + San Felipe + CVP San Luis Deliveries.

TABLE C

RESERVOIR STORAGE AT END OF OCTOBER WATER YEAR 1935 WITH  
PERMANENT SUISUN MARSH D-1485 STANDARDS  
(TAF)

Study	SWP <sup>1/</sup>	CVP <sup>2/</sup>	Total
27A	1,162	1,237	2,399
27B	1,978	1,192	3,170

1/ SWP Storage = Oroville + SWP San Luis.

2/ CVP Storage = Shasta + Clair Engle + Whiskeytown + Folsom  
+ CVP San Luis.

TABLE D

CARRIAGE WATER REQUIREMENTS WITH  
PERMANENT SUISUN MARSH D-1485 STANDARDS  
(TAF)

Water Study	1928 (May- Sep)	1929	1930	1931	1932	1933	1934	1935 (Oct.- Only)	Total
27A	348.9	72.7	229.7	112.7	165.2	0.0	76.3	0.0	1,005.5
27B	348.9	62.7	230.7	112.3	163.0	0.0	42.3	0.0	959.9

TABLE E

MINIMUM D-1485 REQUIRED OUTFLOW WITH PERMANENT SUISUN MARSH D-1485 STANDARDS  
(TAF)

Study	1928 (May- Sep)	1929	1930	1931	1932	1933	1934	1935 (Oct.- Only)	Total
27A	1831.7	3629.7	4975.3	2857.4	4924.3	2880.2	2882.5	184.5	24,165.5
27B	1831.7	3643.3	4989.9	2861.7	4972.4	2908.4	2909.7	184.5	24,301.6

TABLE F

ADDITIONAL OUTFLOW REQUIRED TO MEET NDWA CONTRACT  
(TAF)

Study	1928 (May- Sep)	1929	1930	1931	1932	1933	1934	1935 (Oct.- Only)	Total
27A	0	298.3	87.3	145.4	105.8	199.0	182.4	50.6	1,068.8
27B	0	0	0	0	0	0	0	0	0

TABLE G

SURPLUS DELTA OUTFLOW  
(TAF)

Study	1928 (May- Sep)	1929	1930	1931	1932	1933	1934	1935 (Oct.- Only)	Total
27A	4	1	1099	0	1280	0	185	0	2569
27B	4	0	1161	0	1297	0	277	0	2739