STATE OF CALIFORNIA
STATE WATER RIGHTS BOARD

In the Matter of Applications 11792, etc., of Calaveras County Water District and Applications 12860, etc., of Tuolumne County Water District No. 2

Decision D 1226

ADOPTED AUG 25 1965

1226

DECISION UPON RECONSIDERATION OF DECISION D 1114

Introduction

By its Judgment and Order of July 24, 1964, in proceeding No. 145784, the Superior Court in and for the County of Sacramento ordered the State Water Rights Board to set aside Board Decision D 1114, adopted March 4, 1963, insofar as the decision denied permits on 5 applications of Tuolumne County Water District No. 2 (hereinafter referred to as "Tuolumne" or "TCWD No. 2") and granted permits on 12 applications of Calaveras County Water District (hereinafter referred to as "Calaveras" or "CCWD").

The Court directed that Decision D 1114 be reconsidered in light of the memorandum opinion of July 17, 1964, which held that the decision was deficient for not having made findings with respect to a proposal advanced by Tuolumne, but not supported by an application, for a project on the North Fork Stanislaus River, referred to as the "modified Colliersville Project".

Accordingly, the Board has reconsidered and compared the Calaveras and Tuolumne proposals in their totality. Evidence received in the course of public hearing was supplemented by additional information prepared by the parties and submitted to the Board subsequent to court remand.

Reference is made to Decision D 1114 for a description of the applications and projects proposed by the two applicants as they were presented at the hearing.

On November 12, 1964, Calaveras filed petitions to change points of diversion under Applications 11792 and 12911 to which were attached as appendices proposed amended applications. The changes also reflect alterations in project plans. The appendices are accepted, in the absence of objection, as amended applications.

Procedure for the presentation of exhibits and statements was agreed upon by counsel for both parties in lieu of further hearing. The arrangement was satisfactory to the Board, and accordingly, TCWD No. 2 Exhibit 42, " Additional Exhibits, Stanislaus River Basin Projects"; TCWD No. 2 Exhibit 43, "Statement by Glenn Sudman"; CCWD Exhibit 51, "Statement of November 12, 1964"; CCWD Exhibit 52, "Summary of Comparison"; and CCWD Exhibit 53, "Statement by Arthur Reitter," dated March 25, 1964, were received into evidence in the absence of objection.

Changes in Tuolumne Project

Prior to the hearing in this matter, Tuolumne had filed applications for a power project which would divert water from the North Fork to the Middle Fork Stanislaus River. This conflicted with Calaveras proposal to develop the North Fork for both power and consumptive use of water in Calaveras County. At the hearing Tuolumne sought to establish that even though its project were constructed, sufficient water would remain in the North Fork to permit a feasible power project on that stream which could finance the cost of conserving water for irrigation and other consumptive uses in Calaveras County (the so-called modified Collierville Project).

The Board in its Decision D 1114 did not consider the Modified Collierville Project because no application had been filed in support of it. The court held that this failure was erroneous. While not required to do so, Tuolumne has now filed Application 21946 which describes its present plan for development of the North Fork stream system below Spicer Meadows. The Board takes official notice of this application and gives consideration to the information contained therein, although it is not possible to dispose of it at this time because of procedural requirements.

Although Application 21946 indicates that Tuolumne would construct this North Fork project, it states that "This project has been developed to permit the delivery of Stanislaus River water at Calaveras Outlet (on the Murphy's Tunnel) for

irrigation and other uses in Upper Calaveras County and to finance the cost of the work necessary for such delivery by the generation and sale of hydroelectric power." Presumably, some arrangement would be entered into between Tuolumne and Calaveras in order to accomplish the stated objective. No mention is made of financing the cost of conveying the water from the Calaveras Outlet to the place of use.

Tuolumne now proposes construction of Big Trees Powerplant with a capacity of 25 megawatts. This would require the construction also of Big Trees Tunnel with a diameter of 11 feet 6 inches. These two facilities would be additional features of the District's plan for development of the North Fork which were not presented at the prior hearing.

In connection with the proposed North Fork-Middle Fork Project, Tuolumne proposes to construct a 40-megawatt power generating unit. This is the Stanislaus Powerplant No. 2. In connection with it, the Stanislaus Tunnel No. 2 would be constructed with a diameter of 12 feet 9 inches. In all other respects this project proposed by Tuolumne is unchanged.

Changes in Calaveras Project as Set Forth in Amended Applications 11792 and 12911

Calaveras now proposes to construct Stage A with Spicer Meadows Reservoir at 169,000 acre-foot (af) capacity in lieu of 130,000 af. This represents an increase of 39,000 af gross storage.

In Stage B, Calaveras now proposes to construct Ganns Reservoir to a capacity of 32,000 af in lieu of 60,000 af, which represents a decrease of 28,000 af gross storage.

Calaveras also proposes to reduce Murphy's Tunnel and Ganns Tunnel to a diameter of 14 feet 6 inches, which represents a decrease of 18 inches for each tunnel.

The Collierville Powerplant, scheduled for construction as part of Calaveras Stage A, is to remain at 115-megawatt capacity but with a single generating unit in place of two.

Project Similarity

A critical examination of the projects proposed for development by Tuolumne and Calaveras reveals similarities and differences which must be taken into consideration in determining which applicant offers the plan that will more fully develop the resources of the Stanislaus River and its tributaries.

The most striking similarity is that both applicants propose delivery of Stanislaus River water for irrigation and other uses in upper Calaveras County and propose to finance the cost of the work needed for such delivery by the generation and sale of electric energy.

Tuolumne County and Calaveras County abut the North Fork Stanislaus River on opposite sides and share its watershed. Neither county has any other opportunity to develop sufficient

hydroelectric energy needed to finance the major developments that are required to provide water for consumptive use.

Both projects would put water to beneficial use within the watershed or an area immediately adjacent thereto. There is sufficient unappropriated water in the named sources to supply the project requirements of either applicant without injury to any downstream vested right, provided the operation plan of either project is adhered to.

Proposed Storage

Tuolumne, as part of its North Fork-Middle Fork Project, proposes construction of Spicer Meadows Reservoir to a capacity of 164,000 af. This includes 4,000 af utilized by Pacific Gas and Electric Company in the existing Utica System. In addition, Silver Creek Reservoir would provide an estimated 500 af capacity with Sand Bar Reservoir accounting for another estimated 500 af. The total new storage developed by this project thus amounts to about 161,000 af.

The planned development of the North Fork by Tuolumne would include four reservoirs. Big Trees would provide 162,000af, Squaw Hollow 2,000 af, Upper Beaver an additional 600 af, and Lower Beaver another 30 af. The 4,000 af now utilized by PG&E at Spicer would be acquired. The total storage thus provided by Tuolumne would be 329,630 af.

In Stage A development, Calaveras would construct a Spicer Meadows Reservoir with a storage capacity of approximately

169,000 af. In addition, Calaveras Stage A provides for 162,000 af at Big Trees Reservoir, 600 af at Upper Beaver, 30 af at Lower Beaver, 2,000 af of storage at Squaw Hollow, and 225,000 af of off-stream storage capacity at Littlejohns Reservoir. The total storage developed in Stage A thus amounts to 558,630 af. Tuolumne has questioned the propriety of Calaveras including the off-stream storage at Littlejohns Reservoir in that it does not represent a part of the power project. However, we must regard the facility as part of the overall development of the water resource, and for this purpose, it should be included in the total new storage proposed by Calaveras.

The second stage of Calaveras project proposes the construction of four additional storage reservoirs. North Fork diversion dam would provide 700 af of storage, Ganns Reservoir would add another 32,000 af, Jesus Maria would provide capacity for 20,000 af of North Fork water, and Black Creek Reservoir would provide 5,000 af of storage.

The ultimate development planned by Calaveras for both Stage A and Stage B would result in a total storage capacity of 616,330 af.

Water for Consumptive Use

The area of use proposed by Calaveras for ultimate development includes a total of approximately 180,449 acres of irrigable land which has been divided into three zones of

crop and water use based substantially on elevation. The District estimates that under ultimate development 585,808 acre-feet annually (afa) of water will be required for irrigation purposes for this area. Initially (Stage A), the Foothill Area, mostly in San Joaquin County, will receive an average of about 153,000 afa from the North Fork Stanislaus for irrigation of about 85,000 acres. Ultimately, most of this water will be used for irrigation within Calaveras County and the water requirements of the Foothill Area will, at that time, be supplemented by water from other projects.

In addition to the irrigation requirements, about 5,800 afa would be made available from the North Fork to supply domestic requirements at Ebbetts Pass.

Application 21946 for the development of North Fork Stanislaus and Beaver Creek by Tuolumne states that the power project is designed to accomplish the delivery of water for use in Calaveras County on a schedule of four steps, ranging from 4,700 afa initially to 14,400 afa by 1985; 35,000 afa by 2008; and 78,000 afa by the year 2025 after payoff of the bonds and thereafter. However, nothing is shown for diversions in excess of 14,400 afa in financial feasibility studies submitted by the applicant.

Both Calaveras and Tuolumne in their initial North Fork development provide for a diversion of 4,700 afa to the Utica Ditch service area now operated by PG&E.

Tuolumne estimates that its requirements for domestic purposes will increase from the present level of 2,300 afa to 26,940 afa by the year 2020 and that irrigation use will increase from 6,000 afa to 42,438 afa during the same period.

The areas of rapid expansion around the communities of Columbia, Twain Harte, and Sonora are presently being served from PG&E Tuolumne Ditch. Plans by which Tuolumne proposes to enlarge the PG&E's Phoenix Reservoir and thereby increase storage of spring and winter flows used for power generation could provide for the District's requirements until about 1985. Sometime thereafter and prior to the year 2020, additional storage facilities would have to be constructed.

None of the project plans introduced into evidence in this proceeding provide for diversion of water to meet any of these anticipated needs. However, it is planned that at some future date, 30,000 afa of the yield of the project under consideration would be exchanged with downstream users for an upstream diversion on the South Fork Stanislaus. Calaveras also contemplates this future upstream diversion by Tuolumne and, in its operation study, provides for 30,000 afa depletion above Goodwin Dam for this purpose.

Electric Generation

An examination of the installed generating capacity which each applicant proposes is necessary in order to determine

which project would make the best use of the power producing potential of the stream system.

Listed below are the power sites selected by the applicants with the new installed capacity for each plant measured in megawatts (MW). Since both applicants propose to construct in two stages, the first group of figures represents Calaveras Stage A development compared with Tuolumne North Fork-Middle Fork and modified North Fork facilities. The second group represents a comparison of the applicants' final or ultimate stage.

Location of Plant Site	CCWD	TCWD No. 2
Big Trees	50 MW	25 MW
Collierville	115	80
Spicer	--	36
Donnells No. 2	--	30
Sand Bar	--	21.7
Total	165 MW	192.7 MW

The difference between the two proposed projects can thus be seen as an installed capacity of 27.7 megawatts by Tuolumne beyond that which the Calaveras proposal is able to accomplish in the first stage of development. Under ultimate development, the new installed capacity provided by Calaveras exceeds that proposed by Tuolumne by 88.3 megawatts as shown below.

Location of Plant Site	CCWD	TCWD No. 2
Sand Flat	25 MW	--
Spicer	--	36 MW
Board's Crossing	85	--
Donnells No. 2	--	30
Sand Bar	--	21.7
Big Trees	50	25
Stanislaus No. 2	--	40
Collierville	161	80
Total	321 MW	232.7 MW

The total generating capacity which a system is designed to produce must be related to the marketability of the electric power. Since neither of the applicants proposes to engage in the business of distribution, they each indicate that their generating system would be operated as a contributing unit to the facilities presently operated by PG&E. In estimating revenue to be derived from electric generation, each of the applicants has considered the value to be assigned to the capacity of its plant system in relation to the system load curve of the operating public utility company. This relationship has been expressed as a capacity factor and is the percentage of time that the generating facility is needed for peaking purposes. Calaveras uses a 41.5 per cent capacity factor for its initial Stage A development as compared to 41.7 per cent used by Tuolumne for its North Fork-Middle Fork project and 41.6 per cent for the modified North Fork project. The difference is considered by the Board to be negligible when compared to other variables, such as water supply, plant efficiency, costs of construction, and interest on bonds.

Therefore, the Board has accepted the capacity factors as submitted in computing estimated revenue for both applicants.

With respect to the estimated price for the sale of energy, both applicants used the figure of $20.83 per kilowatt of dependable capacity and 2.73 mills per kilowatt hour of energy. These are lower estimates than originally presented by Calaveras derived from studies of equivalent cost of steam power. However, the figures were submitted by Calaveras after Decision D 1114 and are considered by the Board as much more representative of possible minimums.

At 41.5 per cent capacity factor, Calaveras estimates that its proposed generating system for Stage A construction would produce 140.6 MW of dependable capacity. Under ultimate construction, Calaveras estimates 238.1 MW of firm capacity. The latter is based upon a 34 per cent capacity factor and with 14,400 afa of water diverted to Calaveras County.

The first stage of development as proposed by Tuolumne, using 41.7 and 41.6 per cent capacity factors, would produce 156.5 MW of dependable capacity and under ultimate development, Tuolumne estimates 232.7 MW of firm capacity. The latter is also based upon a 34 per cent capacity factor and the same quantity of water diverted as assumed by Calaveras.

The annual value for each of the District's initial projects, when translated into estimated revenue from the sale of dependable capacity of the generating system plus the sale of energy, results in Tuolumne producing an estimated

$5,712,000 as against $4,603,416 estimated by Calaveras for its proposed project.

Thus it can be seen that the first stage Tuolumne development would provide more installed generating capacity, greater dependable capacity, and more revenue than the first stage project proposed by Calaveras.

However, at the end of their second stage of construction, the annual value of Tuolumne's electric generating project would be $7,207,000 while Calaveras's would be $7,457,674.

There is sharp disagreement between the two applicants as to the costs which will likely be encountered in the construction, operation, and maintenance of the two proposed projects. Each has made its own estimate and drawn a comparison between the two plans by making adjustments which have resulted in substantial differences in estimated field costs alone. Each has complained that the other's figures are not justified.

Where examination of the cost components relied upon indicated a reasonable basis for accepting those of one applicant over those submitted by the other, the Board has done so.

A critical examination of estimated construction costs presented by Tuolumne in Exhibit 42, Section T32, and Calaveras Exhibit 51, Section C-R 23a, for facilities below

Spicer Meadows Dam is set forth in Table 1. It shows that there are some differences of opinion for costs of various items. However, when honest men differ in their opinions of actual construction costs of project works, and in the absence of objective criteria for resolving those differences, the differing estimates must be accepted at face value. This, the Board also has done. An example is the inclusion of 5 per cent for contingencies in the Tuolumne North Fork-Middle Fork project construction cost estimate and use of 18 per cent for engineering, contingencies and administration.

In estimating plant efficiency, Tuolumne has used 87 per cent. It is argued by Calaveras that this should be discounted by 5 per cent to allow for nonsalable or waste energy due to outages and periods of time when it would be impractical to fit the energy into the load curve of the distributing system. Complaint is also made that Tuolumne has relied upon an unrealistic operation study using all available water.

In estimating the interest rate to be applied during construction, Calaveras has used 9 per cent for its project while Tuolumne estimates that it would be 8 per cent for its project. Tuolumne argues that its lower figure is justified since the elapsed time from start of construction until the project can earn revenue will be less than the North Fork project of Calaveras.

TABLE 1

ESTIMATED COST OF NORTH FORK PROJECTS BELOW SPICER

Item	Estimated Cost TCWD #2 Exhibit Section 2 - T-32		Estimated Cost CCWD Exhibit C-R-23a		Difference
	Account Total	Project Total	Account Total	Project Total	
BIG TREES RESERVOIR					
Land and Land Rights	$ 190,000	$	$ 190,000	$	$ 0
Reservoirs, Dams and Waterways	11,460,000		11,500,000		+ 40,000
Permanent Roads and Bridges	230,900		230,900		0
Total Estimated Construction Cost	11,880,900		11,920,900		
Engineering, Contingencies and Administration (23%)	2,732,600		2,741,800		
Total Estimated Project Cost		14,613,500		14,662,700	+ 49,200
UPPER BEAVER DIVERSION					
Land and Land Rights	30,800		30,800		0
Reservoirs, Dams and Waterways	708,500		746,300		+ 37,800
Permanent Roads and Bridges	35,000		35,000		0
Total Estimated Construction Cost	774,300		812,100		
Engineering, Contigencies and Administration	178,100		186,780		
Total Estimated Project Cost		952,400		998,880	+ 46,480
BIG TREES TUNNEL					
Reservoirs, Dams and Waterways	5,427,400		7,361,800		+ 1,934,400
Permanent Roads and Bridges	343,200		343,200		0
Total Estimated Construction Cost	5,770,600		7,705,000		
Engineering, Contingencies and Administration	1,327,200		1,772,150		
Total Estimated Project Cost		7,097,800		9,477,150	+ 2,379,350

TABLE 1 - (continued)

ESTIMATED COST OF NORTH FORK PROJECTS BELOW SPICER

Item	Estimated Cost TCWD #2 Exhibit Section 2 - T-32		Estimated Cost CCWD Exhibit C-R-23a		Difference
	Account Total	Project Total	Account Total	Project Total	
BIG TREES POWER PLANT					
Power Plant Structures and Improvements	$ 527,100		$ 430,000		$ - 97,100
Water Wheels, Turbines and Generators	1,112,500		1,488,000		+ 375,500
Accessory Electrical Equipment	215,000		342,000		+ 127,000
Miscellaneous Electrical Equipment	195,000		150,000		- 45,000
Permanent Roads and Bridges	6,500		6,500		0
Switchyard Structures	31,500		50,000		+ 18,500
Switchyard Equipment	162,500		260,000		+ 157,500
Total Estimated Construction Cost	2,250,100		2,726,500		
Engineering Contingencies and Administration	517,500		627,045		
Total Estimated Project Cost		$ 2,767,600		$ 3,353,545	+ 585,945
SQUAW HOLLOW DAM					
Land and Land Rights	11,300		11,300		0
Reservoirs, Dams and Waterways	1,751,150		1,800,450		+ 49,300
Permanent Roads and Bridges	227,550		227,550		0
Total Estimated Construction Cost	1,990,000		2,039,300		
Engineering, Contingencies and Administration	457,700		469,039		
Total Estimated Project Cost		2,447,700		2,508,339	+ 60,639
LOWER BEAVER DIVERSION					
Land and Land Rights	1,200		1,200		0
Reservoirs, Dams and Waterways	300,300		300,300		0
Total Estimated Construction Cost	301,500		301,500		
Engineering, Contingencies and Administration	69,400		69,400		
Total Estimated Project Cost		370,900		370,900	0

TABLE 1 - (continued)

ESTIMATED COST OF NORTH FORK PROJECTS BELOW SPICER

Item	Estimated Cost TCWD #2 Exhibit Section 2 - T-32		Estimated Cost CCWD Exhibit C-R-23a		Difference
	Account Total	Project Total	Account Total	Project Total	
MURPHYS TUNNEL					
Reservoirs, Dams and Waterways	$ 9,166,000		$13,726,050		$ + 4,560,050
Permanent Roads and Bridges	121,200		121,200		0
Total Estimated Construction Cost	9,287,200		13,847,250		
Engineering, Contingencies and Administration	2,136,000		3,185,281		
Total Estimated Project Cost		$11,423,200		$17,032,531	+ 5,609,331
COLLIERVILLE POWER PLANT					
Power Plant Structures and Improvements	1,117,000		1,250,000		+ 133,000
Water Wheels, Turbines and Generators	2,620,000		2,200,000		- 420,000
Accessory Electrical Equipment	292,000		350,000		+ 58,000
Miscellaneous Electrical Equipment	168,000		165,000		- 3,000
Permanent Roads and Bridges	282,900		175,300		- 107,600
Switchyard Structures	80,000		100,000		+ 20,000
Station Equipment	640,000		800,000		+ 160,000
Total Estimated Construction Cost	5,199,900		5,040,300		
Engineering Contingencies and Administration	1,196,000		1,159,269		
Total Estimated Project Cost		6,395,900		6,199,569	- 196,331
	Total	$ 46,069,000		$ 54,603,614	+ 8,534,614

Evaluating the applicants' divergent views, the Board is persuaded to accept 9 per cent as the more reasonable estimate of the interest rate to be applied during construction of both projects. This is due in particular to the probability that the construction period for either project would extend over 2 years because of the relatively short construction schedule available each season at the high elevation where Spicer Meadows Reservoir is to be located.

In its estimate of project costs, Tuolumne did not compute the cost to it for the use of existing electric generation facilities which belong to the Tri-Dam Districts. It is reasonable, however, to assume that the owners of facilities on the Middle Fork Stanislaus River would expect to be compensated for the use of dams, tunnels, penstocks, generators, and other facilities already constructed. That this compensation would cost Tuolumne approximately $436,000 per year has been estimated by Calaveras. Such an amount of money as a cost of project operation is not reflected in Tuolumne's estimates, nor is the figure refuted. Tuolumne concedes that some cost may be anticipated, but takes the position that the subject matter is open to negotiation and therefore is unwilling to provide a dollar figure.

The Board is persuaded that the use of facilities owned by others represents a project cost and for the purposes of this decision accepts the estimated annual cost suggested by Calaveras.

Annual operation and maintenance costs have been estimated by both applicants in relation to kilowatts of generating capacity that the respective projects are expected to provide. On this basis, Tuolumne's ultimate development would require an average of $3.00 per kilowatt annually (T. 49B) while Calaveras's ultimate project would average $1.71 per kilowatt each year. An examination of the reason for the lower figure discloses that Calaveras would pay part of the operation and maintenance costs on Stage B out of irrigation revenue. This results in less bond requirement and therefore is not truly representative of the actual cost per unit of generating capacity. For purposes of comparison, a more realistic estimate would be a cost of $2.42 for installed capacity to be applied to the projects of both applicants. This figure is the amount charged by Calaveras per kilowatt installed capacity for Stage A.

Summary and Conclusion

Tables 2 and 3 provide a columnar comparison of the costs, revenues, and surplus for the projects proposed by Tuolumne and Calaveras. The surplus available provides a measure of the financial feasibility for each project because it represents the estimated amount of money which could be used in the construction of facilities for the distribution of water for consumptive purposes.

The basic assumptions made by the Board in analyzing both projects are:

TABLE 2

COMPARISON OF FINANCIAL FEASIBILITY OF CCWD STAGE "A" NORTH FORK PROJECT AT 41.5% CAPACITY FACTOR AND TCWD NO. 2 MODIFIED NORTH FORK PLUS NORTH FORK-MIDDLE FORK AT 41.7% CAPACITY FACTOR AND BOTH 4,700 AFA DIVERSION AND 23% ENGINEERING, CONTINGENCIES AND ADMINISTRATION

	TCWD NO. 2		CCWD	
N.F. cost from Table 1	$46,069,000		$54,603,614	
Spicer Dam	--		7,305,831	(Exh.51,C-R 28a)
Utica System	3,000,000		3,000,000	
Subtotal	49,069,000		64,909,445	
Interest during construction at 9%	4,416,210		5,841,850	
Total Bond	53,485,210		70,751,295	
Cost per Year Total x .0475	2,540,548		3,360,687	
M & O at $2424 x MW installed [a]	254,520		400,000	
Total cost/year	$ 2,795,068		$ 3,760,687	
Annual Value	2,940,000	(Exh.42,T-35)	4,603,416	(Exh.51,C-R 28a)
Annual Surplus Subtotal	144,932		842,729	
N.F.-M.F. Project Cost [b]	35,278,000	(Exh.42,T-30)	--	
Int. during construction at 9%	3,175,020		--	
Total Bond	38,453,020		--	
Cost per year Total x .0475	1,826,519		--	
M & O at $2424 x MW installed	212,585		--	
Total cost/year	2,039,104		--	
Annual Value	2,772,000	(Exh.42,T-33)	--	
Annual Surplus	732,896		--	
Gross Annual Surplus	877,828		842,729	
Annual cost for use of Tri-Dam facilities*	- 436,000		--	
Total Surplus for Projects	$ 441,828		$ 842,729	

[a] M & O has been assumed to be a uniform cost per MW installed capacity proportional to Unit "A" of the CCWD project.

[b] Use Tuolumne figure of 18% for engineering, contingencies and administration; 5% of the contingencies is included in construction estimates (RT 633-634).

* From page 20 of CCWD study dated 11/12/65. No estimate given by TCWD No. 2 for this item.

TABLE 3

COMPARISON OF FINANCIAL FEASIBILITY OF TOTAL PROJECTS OF CCWD AND TCWD NO. 2 ALL AT 34% CAPACITY FACTOR, 14,400 AF DIVERSION TO CCWD AND 23% ENGINEERING, CONTINGENCIES AND ADMINISTRATION

	TCWD NO. 2		CCWD	
Construction (N.F.)	$ 46,069,000		$ 54,603,614	(N.F. Table 1)
Costs from Table 2 (Utica)	3,000,000		7,305,831	(Spicer)
(N.F.-M.F.Project)	35,278,000		3,000,000	(Utica)
Subtotal	84,347,000		64,909,445	
CCWD STAGE "B"	--		42,190,968	(Exh.51,C-R 28a)
TCWD-Stanislaus Project	19,200,000	(Exh.42,T-31)	--	
Total Construction	103,547,000		107,100,413	
Int. during construction at 9%	9,319,030		9,639,037	
Total Bond	$112,866,030		$116,739,450	
Cost per year				
Total x .0475	5,361,136		5,545,123	
M & O at [a] (N.F.)	254,520		400,000	(Stage "A")
$2424xMW installed (N.F.-M.F.)	212,585		378,144	(Stage "B")
(Stanislaus)	96,960		--	
Total Cost/year	$ 5,925,201		$ 6,323,267	
Annual Value	7,207,000	(Exh.42,T-33 T-34 & T-35)	7,457,674	(Exh.51,C-R 28a)
Gross Annual Surplus	1,281,799		1,134,407	
Annual cost for use of Tri-Dam facilities*	- 436,000		--	
Total surplus for projects	$ 845,799		$ 1,134,407	

[a] M & O has been assumed to be a uniform cost per MW installed capacity proportional to Unit "A" of the CCWD project.

* From page 20 of CCWD study dated 11/12/64.
- No estimate given by TCWD No. 2 for this item.

1. Estimated construction costs are indicative of actual construction costs.

2. The Utica Ditch system of PG&E must be purchased.

3. Engineering, contingencies, and administration will be 23 per cent of the total construction costs.

4. Interest during construction will be 9 per cent.

5. The cost per year for bond issue would be the total bond required X 0.0475 (payoff period of 47 years).

6. The annual value per year for power is that amount shown in the respective operation studies at the stated capacity factors.

With respect to total surplus of funds available after payment of bonds, as well as maintenance and operation expenses, the projects of both districts are about the same. However, the project proposed by Tuolumne will provide less than that proposed by Calaveras by reason of about $436,000 per year which it is reasonable to expect will be charged by Oakdale and South San Joaquin Irrigation Districts for the use of Donnells Reservoir, Donnells Tunnel, Beardsley Reservoir, and Beardsley Powerplant.

The Calaveras project, as compared with the Tuolumne project, will more fully develop the water supply and hydro-electric potential of the stream system. Even excluding the off-stream storage reservoir at Littlejohns, the Calaveras project develops more total storage and provides more installed electric generating capacity as well as dependable capacity than

the Tuolumne project. The Calaveras project will also provide more water for consumptive use and more surplus revenue with which to construct distribution facilities.

The Board adopts the findings contained in Decision D 1114 except as modified herein. Upon these findings, the Board concludes that the Calaveras plan will more fully develop the water resources of the North Fork Stanislaus River and will best conserve the public interest. The amended applications of that District, insofar as they relate to diversions from the Stanislaus River system, should therefore be approved.

By stipulation of Calaveras and Tuolumne, permits for 3 cfs on Application 12912 and 5,000 afa on Application 13093 for water to serve Ebbetts Pass have already been issued. Therefore, these quantities will be deducted from the permits to be issued as the result of this decision.

The Board has considered the future needs within the service area of Tuolumne together with the fact that such service area lies within a county of origin. The Board has considered also that diversions averaging 30,000 afa from South Fork and Middle Fork Stanislaus River or their tributaries would not materially impair the feasibility of the Calaveras Project. Therefore, the Board concludes that permits issued to Calaveras should be subject to a future depletion of streamflow to provide for these future requirements.

Carryover storage for a three-year period will be required in order to provide a firm supply to the Tuolumne service area during an extremely dry period of the hydrologic cycle.

Therefore, the permits issued to Calaveras will be subject to a depletion of a quantity not to exceed 90,000 af in any three-year period or an average of 30,000 afa. This amount may be slightly less than a safe yield of 30,000 afa; however, the hydrologic cycle in the past indicates that a three-year carryover storage will provide a substantially firm water supply.

ORDER

IT IS HEREBY ORDERED that the petitions for changes in points of diversion submitted on December 7, 1960, in connection with Applications 12910, 13092, 18727, 18728, 19148, and 19149, petitions for changes in place of use submitted on the same date in connection with Applications 12911, 13092, 18727, and 19148, petition for change in point of diversion submitted on June 25, 1962, in connection with Application 13093, and revised petitions submitted on November 12, 1964, for changes in points of diversion in connection with the Stanislaus River portion of Application 11792 and Application 12911 be, and they are, approved.

IT IS FURTHER ORDERED that Application 11792, as amended, be, and it is, approved insofar as that application relates to water from the Stanislaus River system. Further, that Applications 12537 and 13091 and amended Applications 12911, 13092, 13093, 18727, and 19148 be, and they are, approved, and that Applications 12910, 12912, 18728, and

19149, as amended, be, and they are, approved in part, and that permits be issued to the Calaveras County Water District, subject to vested rights and the following limitations and conditions:

1a. The water to be appropriated under permit issued pursuant to Application 11792 for irrigation, domestic, industrial and recreational purposes shall be limited to the quantity which can be beneficially used and shall not exceed 78,500 afa by storage to be collected from about November 1 of each year to about July 1 of the succeeding year in the amounts and at the locations specified as follows:

(1) 32,000 afa at Ganns Reservoir

(2) 2,000 afa at Squaw Hollow Reservoir

(3) 24,500 afa at Big Trees Reservoir

(4) 20,000 afa at Spicer Meadows Reservoir

b. The water to be appropriated under permit issued pursuant to Application 12537 for irrigation and domestic purposes shall be limited to the quantity which can be beneficially used and shall not exceed 5,000 afa by storage at Black Creek Reservoir to be collected from about November 1 of each year to about April 1 of the succeeding year.

c. The water to be appropriated under permit issued pursuant to Application 12910 for irrigation, domestic and stockwatering purposes shall be limited to the quantity which can be beneficially used and shall not exceed a total of 400 cubic feet per second (cfs) to be diverted from about March 1 to about July 1 of each year at Squaw Hollow or Goodwin Dams.

d. The water to be appropriated under permit issued pursuant to Application 12911 for power purposes shall be limited to the quantity which can be beneficially used and shall not exceed 400 cfs by direct diversion year-round and 78,500 afa by storage to be collected from about November 1 of each year to about July 1 of the succeeding year in the amounts and at the locations specified as follows:

(1) 400 cfs by direct diversion and 32,000 afa by storage at Ganns Reservoir

(2) 2,000 afa by storage at Squaw Hollow Reservoir

(3) 18,500 afa by storage at Big Trees Reservoir

(4) 26,000 afa by storage at Spicer Meadows Reservoir

e. The water to be appropriated under permit issued pursuant to Application 12912 for municipal purposes shall be limited to the quantity which can be beneficially used and shall not exceed 7 cfs to be diverted from about November 1 of each year to about July 1 of the succeeding year.

f. The water to be appropriated under permit issued pursuant to Application 13091 for irrigation, domestic and stockwatering purposes shall be limited to the quantity which can be beneficially used and shall not exceed 63,000 afa by storage to be collected from about November 1 of each year to about July 1 of the succeeding year at Spicer Meadows Reservoir.

g. The water to be appropriated under permit issued pursuant to Application 13092 for power purposes shall be limited to the quantity which can be beneficially used and shall not exceed 63,000 afa by storage to be collected from about November 1 of each year to about July 1 of the succeeding year at Spicer Meadows Reservoir.

h. The water to be appropriated under permit issued pursuant to Application 13093 for municipal purposes shall be limited to the quantity which can be beneficially used and shall not exceed 63,000 afa by storage to be collected from about November 1 of each year to about July 1 of the succeeding year as follows:

(1) 23,000 afa at Spicer Meadows Reservoir

(2) 40,000 afa at Big Trees Reservoir

i. The water to be appropriated under permit issued pursuant to Application 18727 for power purposes shall be limited to the quantity which can be beneficially used and shall not exceed 700 cfs year-round by direct diversion and 25,900 afa by

storage to be collected from about November 1 of each year to about July 1 of the succeeding year as follows:

(1) 60 cfs to be diverted at either Upper or Lower Beaver Creek Diversion Dams or a combination diversion not to exceed 60 cfs at the two points of diversion and 13,100 afa to off-stream storage at Big Trees Reservoir at a maximum rate of 800 cfs from Upper Beaver Creek Diversion Dam

(2) 640 cfs by direct diversion and 12,800 afa by storage at Big Trees Reservoir

j. The water to be appropriated under permit issued pursuant to Application 18728 for irrigation, domestic and stockwatering purposes shall be limited to the quantity which can be beneficially used and shall not exceed 600 cfs by direct diversion to be diverted from about March 1 to about July 1 of each year and 193,640 afa by storage to be collected from about November 1 of each year to about July 1 of the succeeding year. These diversions may be made as follows, provided the combined direct diversion from Big Trees, Squaw Hollow, Goodwin, and Tulloch Reservoirs shall not exceed 590 cfs.

(1) 10 cfs from Lower Beaver Creek Diversion Dam

(2) 13,100 afa to off-stream storage at a maximum rate of 800 cfs from Upper Beaver Creek Diversion Dam to Big Trees Reservoir

(3) 590 cfs by direct diversion and 9,100 afa by storage from the North Fork Stanislaus River at Big Trees Reservoir

(4) 590 cfs by direct diversion and 20,000 afa to off-stream storage at a maximum rate of 400 cfs from Squaw Hollow Reservoir to Jesus Maria Reservoir

(5) 590 cfs by direct diversion from Goodwin Dam

(6) 590 cfs by direct diversion and 151,440 afa to off-stream storage at a maximum rate of 2,500 cfs from Tulloch Reservoir to Littlejohns Reservoir

k. The water to be appropriated under permit issued pursuant to Application 19148 for power purposes shall be limited to the quantity which can be beneficially used and shall not exceed 940 cfs year-round by direct diversion and 79,200 afa by storage to be collected from about November 1 of each year to about June 30 of the succeeding year as follows:

(1) 600 cfs by direct diversion and 52,000 afa by off-stream storage at Spicer

Meadows Reservoir at a maximum rate of 1,000 cfs from North Fork Stanislaus River below the Silver Creek confluence.

(2) 340 cfs by direct diversion from Upper Beaver Creek Diversion Dam

(3) 27,200 afa from North Fork Stanislaus River at Big Trees Reservoir

(4) 52,000 afa by storage from Highland Creek at Spicer Meadows Reservoir, provided, the amount collected to storage at Spicer Meadows Reservoir shall not exceed 52,000 afa from the combined diversions from North Fork Stanislaus River and Highland Creek.

m. The water to be appropriated under permit issued pursuant to Application 19149 for irrigation, domestic and stockwatering purposes shall be limited to the quantity which can be beneficially used and shall not exceed 365 cfs by direct diversion to be diverted from about March 1 to about July 1 of each year and 79,200 afa by storage to be collected from about November 1 of each year to about June 30 of the succeeding year as follows:

(1) A total of 25 cfs to be diverted at either Squaw Hollow or Goodwin Dams

(2) 340 cfs from Lower Beaver Creek Diversion Dam

(3) 42,200 afa by storage at Big Trees Reservoir

(4) 37,000 afa by off-stream storage at a maximum rate of diversion of 1,000 cfs from North Fork Stanislaus River to Spicer Meadows Reservoir

2. The maximum quantity of water to be collected to storage under all permits during any one season shall not exceed:

(a) 169,000 afa at Spicer Meadows Reservoir

(b) 32,000 afa at Ganns Reservoir

(c) 162,000 afa at Big Trees Reservoir

(d) 2,000 afa at Squaw Hollow Reservoir

(e) 151,000 afa at Littlejohns Reservoir

(f) 20,000 afa by off-stream storage at Jesus Maria Reservoir

(g) 5,000 afa at Black Creek Reservoir

3. This permit does not authorize collection of water to storage outside of the specified season to offset evaporation or seepage losses or for any other purpose.

4. The maximum quantities herein stated may be reduced in the license if investigation warrants.

5. Actual construction work shall begin on or before September 1, 1968, and shall thereafter be

prosecuted with reasonable diligence, and if not so commenced and prosecuted, this permit may be revoked.

6. Construction work (under all permits except the one issued pursuant to Application 12537) shall be completed on or before December 1, 1993. Construction work under permit issued pursuant to Application 12537 shall be completed on or before December 1, 1969.

7. Complete application of the water to the proposed uses (under all permits except the one issued pursuant to Application 12537) shall be made on or before December 1, 2015. Complete application of the water to the proposed use under permit issued pursuant to Application 12537 shall be made on or before December 1, 1975.

8. Progress reports shall be filed promptly by permittee on forms which will be provided annually by the State Water Rights Board until license is issued.

9. All rights and privileges under this permit including methods of diversion, methods of use and quantities of water diverted are subject to the continuing authority of the State Water Rights Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable methods of use, or unreasonable methods of diversion of said water.

10. Permittee shall allow representatives of the State Water Rights Board or other parties as may be authorized from time to time by said Board reasonable access to project works to determine compliance with the terms of this permit.

11. In accordance with requirements of Water Code Section 1393, permittee shall clear the site of each of the proposed reservoirs of all structures, trees and other vegetation which would interfere with the use of the reservoir for water storage and recreational purposes.

12. Water entering the reservoirs or collected in the reservoirs during and after the current storage season shall be released into the downstream channel to the extent necessary to satisfy downstream prior rights and to the extent that appropriation of water is not authorized under this permit.

Permittee shall install and maintain an outlet pipe in each of its dams of such size and at such location as is specified by the State Department of Water Resources.

13. Construction of the dams shall not be commenced until the Department of Water Resources has approved plans and specifications.

All permits except the one issued pursuant to Application 12537 shall contain the following additional terms:

14. To the extent that their provisions relate to matters within the jurisdiction of the State Water Rights Board, this permit is subject to the terms of agreements between the permittee and the California Department of Fish and Game, dated October 22, 1964, and the Division of Beaches and Parks of the State of California, dated May 10, 1962, which were filed for record at the hearing on Applications 11792, etc., as Fish and Game Exhibit 9 and Beaches and Parks Exhibit 3, respectively.

15. This permit and all rights acquired or to be acquired thereunder shall be subject to future depletion of streamflow from South Fork and Middle Fork Stanislaus River and their tributaries not to exceed 90,000 acre-feet of water in any three-year period by lawful appropriations of water for reasonable beneficial use by any diverter within the service area of Tuolumne County Water District No. 2, without regard to the time such appropriations are initiated.

IT IS FURTHER ORDERED that Applications 12860, 13011A, 19664, 19665, and 19666 of Tuolumne County Water District No. 2 be, and they are hereby, denied.

Adopted as the decision and order of the State Water Rights Board at a meeting duly called and held at Sacramento, California, on the day of 1965.

/s/ Kent Silverthorne
Kent Silverthorne, Chairman

/s/ Ralph J. McGill
Ralph J. McGill, Member

/s/ W. A. Alexander
W. A. Alexander, Member