CONCERNING WELLS AND PUMP PLANTS UPON LANDS NOW SUPPLIED FROM THE CUYAMACA WATER COMPANY'S FLUME.

T. P. ELLIS,

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CONCERNING WELLS AND PUMP PLANTS UPON LANDS NOW SUPPLIED FROM THE CUYAMACA WATER COMPANY'S FLUME, AND UPON LANDS RELYING ALONE UPON PUMPING FOR THEIR WATER SUPPLY. T.P. Ellis.

TOPOGRAPHY, GROUND WATER AND SOIL: From the ranch of Mr. Ralph Earl, Mgr., the first consumer, one and one half miles east of Lakeside to Mr. Geo Legge ranch just east of Grossmont store the flume follows along the 700 foot contour around the southeasterly slope of the El Cajon Valley a distance of some twelve miles thru badly weathered granitic hills. Above the flume the contours shelve rapidly and break into many small gulleys. Comparatively little has been done to cultivate the ground here although in a few instances where the slope would permit, lifting by pump from the flume has been resorted to. The ground on the low side of the flume drops gradually into the various stream beds and El Cajon Valley. The ground water plane conforms somewhat to the topography but does not shelve so rapidly. It is broken often near the flume but is almost continuous in the valley. Decomposed granite is usually the undersoil near the flume and this carries some very heavy strata of good water notably in the vicinity of the Chase Ranch on the south, F. M. Jennings Ranch on the east, and E. A. Seidel Ranch on the southeast. The undersoil on the Legge Ranch and the immediate vicinity is poor in water but even here is developed 2 M.I. Along the remaining portion of the line good results in water flow have been obtained.

SUPPLY: A majority of the ranchers along the flume have developed wells of their own and many agree that with care in irrigating they can carry their orchards over a dry summer period, without the aid of the flume, some of these are: J. P. Rogers, manager Chase Ranch, E. A. Seidel, Ralph Earl, W. Hemel, Manager Lakeside Inn, O. J. Elmer, Z. Ray, E. F. Kelsey, Manager of J. W. Sefton Ranch, F. A. Springsted, F. M. Jennings, Sheriff, and H. H. Locke.

The belt along the flume is practically free from winter frosts and here is found the bulk of the citrus growth. In the Valley proper frosts occur and few citrus orchards are found.

In the valley formation we find by examination of the existing wells, a body of good under ground water capable of considerable development of continuous flow at a depth of 60 ft or less, near the flume. In the lower parts of the valley where frost has prevented the growth of citrus fruits, a plentiful supply of water can be obtained at 30 ft. depth.

(Memorandum .A.)

COST: From inquiry made in the valley, we find that very few ranchers in this vicinity have kept substantial account of the cost of pumping. Consulting the available cost data we procured from nearly a half hundred ranchers it is evident that their unit costs vary several hundred per cent for hydraulic conditions that are quite equally uniform. (i.e. a lift of 30 to 50 ft. Discharge 8 to 20 M.I.)

Four of the records among the lot which appear most substantial are here quoted and take into account, Cost of Installation, Maintenance Interest and Depreciation.

(1) 6¢ per 1000 gals. for a 8 M.I. plant lifting about 30 ft. C. D. Nichols, foreman of Boston Ranch.

(2) 3¢ to 4¢ per 1000 gals. for a 6 M.I., 5 H.P. plant lifting from 30 to 50 ft. (Geo Peak who has installed numerous plants in the El Cajon Valley.)

(3) 1.1¢ per 1000 gals. - 30 M.I. - 20 H.P. Electric Driven Pump, lifting water 30 feet. Power at 2¢ K.W. hour. (F.M. Jennings) This cost was figured on a 16 day continuous run test in which depreciation, interest and operative charges were taken into account at the following rates: Depreciation etc, 15%, interest 7%, operator $15 per month.

(4) E. A. Seidel 3.4¢ per 1000 gals, 6 M.I. - 10 H.P. electric driven pumps lifting 50 feet and operating 10 hours a day. Depreciation and interest at 22% and labor at $10 per month was used.

CONCLUSION: About 870 acres of land was examined. This includes nearly all the land jointly under flume and well.

The pumps deliver 252 M.I. in about 12 hrs to 765 acres and the flume delivers 81 M.I. to 860 acres, giving a rough average of 207 M.I. to 812 acres for 24 hours. By continuous pumping this would mean something less than 330 M.I. to 812 acres.

The cost of developing 1000 gals ranging from 1¢ to 6¢, for electricity it is about 2¢ and the mean for gas engines now on the ground from 3 to 4 cents.

Name	Blk	Lot	Subdiv	Acres Irrig	Crop	Depth well	H.P.	Gas or Elec	M.I.	Running Cost	S.D.Fl. M.I.	Cost of pump & Motor (Gas-Elec)
1. G Legge		Pt 12-13	Tr E	6		30	2½	G	2		1"	
2 Shearer Pl	E	8-12	Vineyd	40	Vineyd							
				3	citrus						1"	
3. P M Price	E	3-7	"	8	oranges	50	5	G	3	5¢ hr	2⅓"	$500
				20	citrus							
4. " " "	E	3 pt	Somermont Pl	10	"							
				20	5 grapes 5 Decid.	50	5	E	5		2"	$350
5. Alex Legge	E	1-2	Vineyd	3	oranges	23	6	G			1"	
				20	Vineyd							
6. Chase Ranch	Pt trt A		El Cajon	40	oranges	50	5	G	3	6¢ hr	2½"	$325
7. E S Delacour	SW¼ of SW¼		Sec 23	25	oranges	55	3½	G	3	5¢ hr	1"	$400
8. Cox	SW¼ of SW¼		Sec 23	40	"	48	3	G	4		1"	$415
9. J W Sefton	Sec 26 T 16 S R 1 W			15	Alfalfa							
				15	Corn							
				10	Decid.							
				60	citrus		32	G	200"			
									80"			
									40"	$3 day	3"	$15,000
11. E S Vasher	Sec 24 S½ of SW¼			25	citrus	47	2½	G	3½	4¢ hr	1"	$700
12. E S Paul	Pt S-24 T-16-S R-1-W			9	oranges	48	4	G	3		1"	
13. A Roberts	NW of NW S-19			20	"	55	2	G	3/4		1"	$125
14. H H Locke	C E Pt Hillsdale			7	"	60	4	G	4	4¢ hr	-	$1500
15. G A Martin	C E "		"	20	citrus	40	2	G	Dev.		2"	
16. C E Preston	Pt S E of SE S-19				"				"		1½"	
17. Liffening	C E SW¼ of NW¼ S -19					58					2"	
18. Cristie	C E Pt NE of SWS-19			10		39			½"		½"	
20. F M Thompson	lts 1-4 Pt S-18			7	"	57	5	E		$5 Mo	½"	$200
				6	Vege							

LIST OF WATER CONSUMERS
BETWEEN EL MONTE RANCHO AND GROSSMONT SUPPLIED FROM
THE SAN DIEGO FLUME AND THEIR PRIVATE WELLS. (WITH COSTS) T.P.Ellis.

Name	Blk	Lot	Subdiv	Acres Irrig	Crop	Depth Well	H.P.	Gas or Elec	M.I.	Running Cost	S.D. Fl. M.I.	Cost of pump & Motor(Gas-Elec)
21. J M Ashor		4	S-18	9	oranges	60	6	G	3	8¢ hr	2"	
				7	lemons							
				2	Gr frt							
22. F H Taylor						Dev.						
23. F A Springsted	26	8	S Tract	4	Grapes	90	10	E	6	$150 yr	5"	$500
				45	citrus	73			2			
24. E V Clark				25	"	92			2½		2/3"	
25. C C Clark				27	citrus	65	5	E	4	$100 yr	2"	$350
26. O R Cross	24	1-6	S tract	50	grapes	50	4	G	2		2"	
				14	oranges							
27. E A Seidel	36	2	S tract	25	citrus	75	10	G	6 3	4/10 M		$650
	32	4				50	4	G				
28. Bostonio	7 pts	9-10	"	37	"	70-50	12-6	G	8-2	6¢ M	30"	$1600
				525	grapes							
29. Smith & Francis	1	1	Somermont Pl									
	6	9-11	S Tract	17	citrus	25	12	G	3		2½"	
30. C J Rother		2-3	Somermont Pl	20	Olives	30	2½	G			3"	$115
31. F M Jennings	41	2-5	S Tract	30	alfalfa	10 wells						
						36'to40'20E			30 1	1/10 M	4"	$520
32. Z Ray	1	19	Lakeview	1½	"	Cr.	2½	G	2		1/3"	
				½	berries							
33. Lumis & Lumis	1 Pt	4 & 5	"	10	citrus	28	3	G	2	4¢ day	1"	$350
34. O J Elmer	3	⅞ Pt 4	"	6	"	Res.	2	G		5¢ day	2/3"	$217
35. Ralph Earl	102,120	Tr 2	Hill Estl	10	alfalfa	38	6	G	6		1"	
36. W Hembel	700 acres		Lakeside	35	"	20 wells						
				25	vege	25' deep	20	E	100	25¢ hr	4"	$1600
37. J H Kleine	on Los Coches Cr			50	citrus		5			5¢ hr	1 7/10"	

OR THEIR AGENTS.

Name	Blk	Lot	Subdiv	Irrig Acres	Crop	Depth Well	H.P.	Gas or Elec	M.I.	Opera-ting Cost	S.D. Fl. M.I.	Cost of pump & motor (Gas - Elec)
38 H Culbertson by E Hurley	Pt	Tr 5	Hill Est	2.5	strbrs	58	3.5	G				
				12	citrus &c	25	3.5	E	4	4¢ hr	3"	
39 S G Roberts		"	"	4	peaches							
				4.5	oranges							
				10	grapes	60	5	E	2	2¢ hr	1"	$500
40 R W Martin		"	"	8	fruit							
				4	grapes	50	5	E	3	2¢ hr		
				4	peaches	60	5	E	6	2½¢ "	3"	$400
41 A C Novis		"	"	10	grapes	no well					1"	
42 Chrisler & Gardner		"	"	10	peaches	78	5	E	4	2½¢ hr		
				2	citrus	68	5	E	6	2½¢ hr	2"	$405
43 Mrs A E Richards		"	"	8	oranges	50	5	E	3			
				3	strbrs	50	5	E	3			
						50	5	E	1	3¢ hr	1"	
44 A A Armitage		"	"	11	citrus							
				12	Decid.	80	5	G	3	6¢ hr	2½"	$475
45 See 3A	7 & 8	Somermont Pl										
46 C D Walker by J S Wise Mgr	6	"	"			70	4	G	2	5.3¢ hr		
				18	citrus	58	4	G	5	5¢ hr	1"	$500
47 Fred Patterson by A Ballantyne	5	"	"			windmill						
				12	citrus	& 60	5	E	5	8¢ hr	2"	$800
48 Henry Patterson by A Ballantyne	12	"	"	12		none						
49 Miss Lemberger	13	"	"	8	citrus							
				2	strbrs	small one						
50 H R Glenn	4	"	"	12	citrus							
				3	Decid.	80	5	E	2	$5 Min Mo	1"	$550
51 Candee	Pt 3	"	"	small amt							1"	
29 Smith & Frances C J Rother See 30				20		30	2½	G	2		3"	$115
53 E Lisco	3	S Tract		1		No					3/4"	
54 Graves Bros by C R Freeman	4	"		40	citrus	60	5	E	4	6.3¢ hr	5"	
55 D H Gorden	3	"		8	lemons							
				3	oranges							
				10	vineyd	65	5	E	1¼			
				7	olives	70	3½	G	4"+	2½ M	2"	$200

5A

USES OF SAN DIEGO FLUME WATER ALONG HAWLEY FLUME LINE GIVING NOTATIONS BY OWNERS OR THEIR MANAGERS.

Name	Blk	Lot	Subdiv	Irrig Acres	Crop	Depth Well	H.P.	Gas or Elec	M.I.	Opera -ting Cost	S.D. Fl. M.I.	Cost of Pump & Motor (Gas - Elec)
56 Kilpatrick by W Harpe		6-7	S Tract	14	citrus	80 Dev.	9 another	G	3		1"	
57 J W Going by C E Rimbey	39	1	"	12	"	70	8	Gm	1			$560
						65	3	G	1		1½"	$400

Sheets 5A and 5B show 208 acres getting 79 M.I. total from flume and wells, 56 M.I. of this is well water and 23 M.I. is from the flume.

The total running expenses equals about 3½¢ per 1000 gals. Oil costs 25¢ per gal and distillate 10½¢ per gal.

LIST OF PERSONS USING THEIR OWN WATER PLANTS FOR IRRIGATION IN VARIOUS PARTS OF EL CAJON VALLEY.

Name	Blk	Lot	Subdiv	Acres Irrig	Crop	Depth Well	H.P.	Gas or Elec	M.I.	Running Cost	S.D. Fl. M.I.	Cost of Pump & Motor (Gas-Elec)
F R Manning		18	Stevens & Hartley	5		24	3	G		40¢ da		
Joe P Miller		Pt J	El Cajon	5½ alfalfa 4 citrus		30	three 5 HP	E	5 ea	$12.60 Mo		
S H Roberts		Pt L	"	5 peaches 1 alfalfa		30	5	E	8	$5 Mo		$350
A T Hawley		Pt M	"	50	grapes		6	G	12	50¢ da		$500
M Gaston		Bet L & F		14	alfalfa	30	5	E	20	$5 Mo		$600

COST OF PUMPING IN EL CAJON VALLEY FOR CUYAMACA WATER CO.

DATA FROM HAZARD GOULD CO. AND HALLOWAY - S.D. GAS AND ELECTRIC COMPANY.

A.Taylor.

Query: To deliver 8 M.I. of water in El Cajon Valley against a lift of 50 ft. what is the cost of:

Distillate Engine Plant
Electric Motor Plant
Operation
Maintenance, repairs and depreciation.

Thru a lift of 50' to deliver 8 M.I. (72 gal per min) water it requires:

$\frac{0}{50} \times \frac{62.5}{550}$ (50) = by Distillate Plant 0.91 Thoe H P = by Electric Motor Plant 0.91 Thoe H P

say overall effy of 30% Say overall effy of 36%

$\frac{.91}{.30}$ = 3 H P Engine $\frac{.91}{.36}$ = 2.5 H P Motor

FIRST COST (NOT INCLUDING WELL)

	SYSTEM DISTILLATE	SYSTEM MOTOR
1 Byron & Jackson centrifugal pump 100 gal min	52.50	52.50
1 3 H P Faribanks Morse Engine	240.00	
1 3 H P Motor		48.00
1 foot valve	2.80	2.80
100' 2" W I Pipe	10.50	10.50
Delivery and installing	40.00	20.00
Building etc	50.00	50.00
Total	$395.80	$183.80

COST OF PUMPING EL CAJON VALLEY CONTINUED

(Pint of distillate or 1/8 gal per H P hour.)

Operationl year	System Distillate	System Motor
1 yr distillate 5¢ per hr - say 90% continuous run	$ 396.00	$ 0.00
1 yr motor - 2.0¢ H P hr - 2.0x2.5x.90x24x365		394.00
1 yr Partial service of operator 1 Mo Dis 20.00		
1 Mo motor 15.00	240.00	180.00
Total -----	$636.00	$574.00

MAINTENANCE, REPAIRS, DEPRECIATION AND INSURANCE.

	Distillate	Motor
Distillate-15% minus installation .15x305	$45.70	
Motor 15% .15x163.80		$24.60
Building 5%	2.50	2.50
	$48.20	$27.10

TOTAL ANNUAL EXPENSE

	System Distillate	System Motor
Interest on 1st cost at 7%	$27.70	$12.80
Operation	636.00	574.00
Maintenance,repairs, depreciation and insurance	48.20	27.10
* Total -----	$ 711.90	$613.90
* Cost per 1000 gal	$ 2.10	$ 1.81
* Cost per ac. ft.	6.85	5.90

LIPPINCOTT'S GENERAL FIGURES.

1 Ac Ft raised 1' cost 5¢ 50 foot lift at 5¢ $ 2.50

* The cost of the well is not entered into the computations.

COST OF PUMPING IN EL CANON VALLEY CONT'D.

The S. D. Consolidated Gas & Elect Co., submitted the following rates for power on 5 years contract.

2¢ per K W hour for $300 a year use guaranteed.
2½¢ " " " " " $150 " " " " "
3¢ " " " " " $100 " " " " "
3½¢ " " " " " $ 60 " " " " "

Power delivered a reasonable distance of extension, probably 1000 feet under a 5 year contract for say a $300 a year use guaranteed.

Ed Fletcher Papers

1870-1955

MSS.81

Box: 36 Folder: 7

Business Records - Reports - Ellis, Thomas P - "Concerning wells and pump plants upon lands now supplied from the Cuyamaca Water Company's flume"