

LOCATION AND LINEAR WATERWAY FOR SCOURING SLUICES IN ANICUTS.

FOREWORD.

There had been no uniform procedure or standard adopted in designing the linear waterway of the scouring sluices. In Chief Engineer's (Irrigation) Circular No. 7758/60A-1, dated 9th September 1960, it was indicated that the scouring sluices may be provided with linear waterway equal to that of head sluices. Since then experiments on the optimum waterway and location of the head and scouring sluices were conducted on models in the Irrigation Research Station, Poondi. The report published below contains the results of studies so far conducted. These experiments are in a preliminary stage only and the design aspects on locating scouring sluices at right angles to the line of anicut and head sluice are being further studied.

K. V. EKAMBARAM,
Chief Engineer (Irrigation).

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THE NEW IRRIGATION ERA

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REMEMBER AN OUNCE OF LOYALTY IS WORTH A POUND OF CLEVERNESS.
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LOCATION AND LINEAR WATERWAY FOR SCOURING SLUICES IN ANICUTS.

BY

SRI K. T. GANAPATHY, B.E. (Hons.) *

SRI R. N. KRISHNAN, B.E., † and

SRI K. RAJENDRAN, B.E. ‡

1. Synopsis.

This article deals with the investigations carried out to determine the optimum linear waterway for scouring sluices in anicuts with reference to the waterway of the head sluices and the proper location of the scouring sluices and the head sluices in the anicut system for efficient and economic functioning. Based on the model experiments conducted in the Irrigation Research Station, Poondi, the optimum linear waterway for scouring sluices has been found to be about one to one and a half times that of the head sluices. The best orientation of the scouring sluices and the head sluices with respect to the alignment of the anicut has also been evolved after model tests. A brief account of these experiments and the findings is presented in this article.

2. Introduction.

2.1 Scouring sluices provided in the anicuts mainly serve the purpose of keeping open through the river bed a well defined deep channel leading to the head sluices. By occasional scouring of the deposited materials, they also help in keeping the bed of the approach channel to the head sluice at a depth lower than the sill level of the head sluices and thus minimise the amount of bed silt passing into the canal. The efficiency of the scouring sluices has therefore to be judged by the degree of silt exclusion they provide for the canals which they serve.

2.2 At present, no uniform procedure or standard seems to exist for determination of the

waterway to be provided for such an important structure as the scour vent in relation to the waterway of the head sluices. An analysis of the waterways provided for the scour vents in a few of the existing irrigation systems indicates that they bear no definite relation to the linear waterway of the head sluices and are found to vary in the order of 12 per cent to 200 per cent of the linear waterway of the head sluices (vide table 1).

2.3 Therefore model studies were undertaken in this Research Station to find out the optimum linear waterway for the scouring sluices. Incidentally the question of the proper orientation of the scouring sluices and the head sluices with respect to the alignment of the anicut and the river flow was also investigated.

3. Experiments.

3.1. These experiments were carried out in a mobile-bed river model in which sand was used as river bed material and a typical anicut system was incorporated including the scouring sluices, head sluices and the canal. In the first series of experiments, the commonly-adopted lay-out of the head sluices and scouring sluices was tested, i.e., the head sluice was located in line with the bank of river so that the canal takes off at right angles to the river flow and the scouring sluices were located in line with the anicut (vide lay-out (1) in the figure-1). As a typical case, the sill level of the scour vents was kept 1.5 feet lower than the sill level of the head sluices. A discharge corresponding to 3,000 cusecs was

measured and allowed in the river. A series of experiments were carried out trying the following linear waterways for scouring sluices:—

1. Half the linear waterway of the head-sluices.
2. Three-fourths the linear waterway of the head sluices.
3. Equal linear waterway of the head sluices.
4. One and a half times the linear waterway of head sluices.
5. Twice the linear waterway of head sluices.

In each one of the above trials, discharges corresponding to 10, 20 and 30 per cent of the discharge in the river were sent down through the scouring sluices and the balance was diverted into the canal. In order to simulate the silt load carried by the river, sand was injected in the river course upstream of the anicut at the rate of 1.25 cubic feet per hour. For each set of experiment, the quantity of sand passing through the scouring sluices and the head sluices was determined by collecting the sand entering them every hour separately in the sand traps provided in the model and measuring the same. This observation provided the yard-stick with which the efficiency of a scour vent can be measured.

3.2 The efficiency of a scour vent can be expressed as the quantity of sediment drawn by the scour vent per cusec of discharge.

$$n_s = \frac{S_s}{Q_s}$$

Where n_s = efficiency of the scour vent.

S_s = quantity of sand through the scour vent.

Q_s = discharge through the scour vent.

A plot of this scouring efficiency Vs the discharge through the scouring sluices has been presented in figure-2 for all the trials made in this series.

3.3. *Linear waterway of scouring sluices.*— It is seen from figure-2 that the efficiency of the scouring sluices increases as their waterway is increased from half to one and a half times the

linear waterway of head sluices and then when the waterway is increased to twice the waterway of head sluices the efficiency begins to decrease. Thus it is found that the scouring sluices with one and a half times the linear waterway gives optimum results in excluding maximum quantity of sand from canal. The perusal of figure-2 also reveals that scouring sluices with waterway equal to that of the head sluices shows only a slight reduction in efficiency and are nearly as effective as scouring sluices with waterway equal to one and a half times the waterway of head sluices. Therefore it is considered that the linear waterways for scouring sluices in anicuts may be about one to one and a half times the waterway of head sluices.

3.4. The above series of experiments were then extended to investigate the proper orientation of the scouring sluices and the head sluices with reference to the alignment of the anicut so that the scouring sluices may function with optimum efficiency excluding maximum quantity of silt from the canal.

In addition to the lay-out of the head sluices and scouring sluices described in the proceeding paragraphs, the following two lay-outs were tested:—

1. Canal taking off straight from the alignment of the anicut and the scouring vents in line with the anicut (Lay-out-2 in figure-1).

2. Canal taking off straight from the river and the scour vents perpendicular both to the anicut and the head sluice. (Lay-out-3 in figure-1.)

3.5. The results obtained are shown plotted in figure-3. The percentage of sand drawn through the scouring sluices is plotted against the discharge through the scouring sluices for the three different lay-outs for a linear waterway of scouring sluices equal to one and a half times that of the head sluices.

3.6. These experiments have brought out a very significant fact, namely, that the design of the anicut system as shown in lay-out-3 in figure has a very great effect in exclusion of

* Executive Engineer (Res.) Irrigation Research Station, Poondi.

† Assistant Engineer (Res.), Irrigation Research Station, Poondi.

‡ Junior Engineer (Res.), Irrigation Research Station, Poondi.

silt from the canal compared to the other two lay-outs. Thus, for a discharge of 900 cusecs through the scouring sluices, the percentage silt drawal through the scour vents in lay-out 1 is 26.50 while in the case of lay-out 3, it is 77.80 (i.e.,) an increase of roughly 200 per cent. The results, though qualitative in nature clearly show the advantages of lay-out-3 from the point of view of silt exclusion from the canals.

3.7. The above said phenomenon may be explained as follows :—

In the case of lay-outs-1 and 2, the scour vents are in line with the anicut and the flow through these is in the same direction as the river flow whereas in lay-out 3, the scour vents are perpendicular to the anicut and the head sluice and the flow through the scour vents is at right angles to the river flow. Thus a curvature is imposed on the flow through the scour vents in lay-out-3. It is well-known that wherever curved flow exists in a mobile bed, the centrifugal force at the curve produces a cross-current perpendicular to the flow direction which moves the bed material from the outer or concave side to the inner or convex side of the curve so that a major portion of the silt is kept moving only on the inner or the convex side. The scour vents in lay-out-3, being on the inner side of the curved flow at this point, draw in a comparatively larger quantity of sand for the same discharge through the scour vents.

3.8. On account of the foregoing reasons and as revealed by the model studies it is considered that the design of the anicut system as

shown in lay-out 3 in figure-1 will go a long way in mitigating the problem of silting in canals which exists in most of the irrigation systems in Madras State.

4. Conclusion.

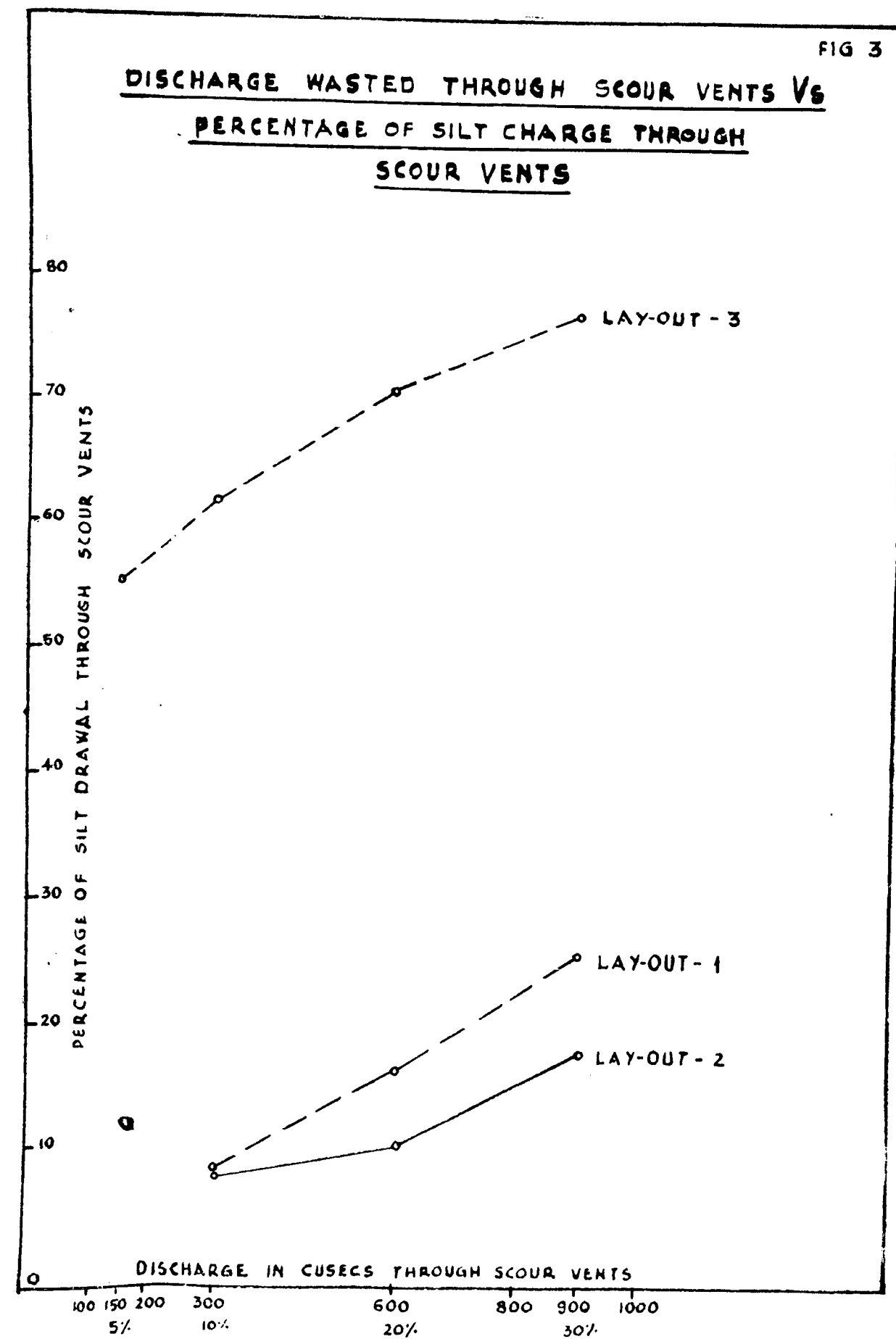
The results of the model studies conducted in this station reveals that the optimum linear waterway for the scouring sluices in anicuts will be about one to one and a half times the waterway of the head sluices. Experiments were also conducted on three different lay-outs of the head sluices and the scouring sluices with respect to the alignment of the anicut as shown in figure-1. The results of these tests indicate that the lay-out No. 3 in which the scour vents are located perpendicular to the anicut and the head sluice is the best from the point of view of silt exclusion from canal.

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TABLE 1.—Showing a comparison of waterways provided for scouring sluices and head sluices in existing irrigation systems.

Serial number and name of irrigation system.	Head sluice.		Scouring sluice.		Waterway for scouring sluices.	
	Number and size of vents.	Total linear waterway.	Number and size of vents.	Total linear waterway.	Waterway of head sluices. Col. (5) × 100	Col. (3) × 100
	(1)	(2)	(3)	(4)	(5)	(6)
	nos.		nos.			
1. Kodiveri Anicut	5 5' 2"	25' 10"	1 6' 0"	6'	10.72	
	6 5' 0"	30' 0"				
2. Srivaikuntam Anicut	6 4' 0"	24' 0"	9 4' 0"	36' 0"	150	
	2 6' 0"	12' 0"	9 4' 0"	36' 0"	150	
	3 4' 0"	12' 0"				
3. Chitrachavadi Anicut	4 6' 0"	24' 0"	1 4' 0"	4' 0"	17	
4. Suratapalli Anicut	5 8' 0"	40' 0"	4 8' 0"	32' 0"	80	
5. Palar Anicut	15 5' 0"	75' 0"	20 5' 0"	100' 0"	108	
	3 6' 0"	18' 0"				
	18 5' 0"	90' 0"	22 5' 0"	110' 0"	105	
	3 5' 0"	15' 0"				
6. Orakkorai Venkatarama Chettiar Channel	1 3' 0"	3' 0"	1 6' 0"	6' 0"	200	



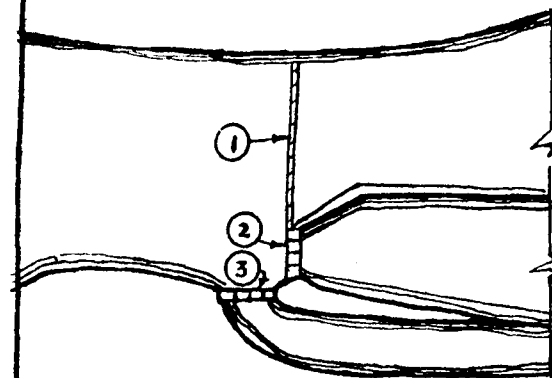
Sri A. R. Venkataraman, Member, Plan Projects, inspecting the improvements to the intake of the Kaverypauk Channel at Palar Anicut.



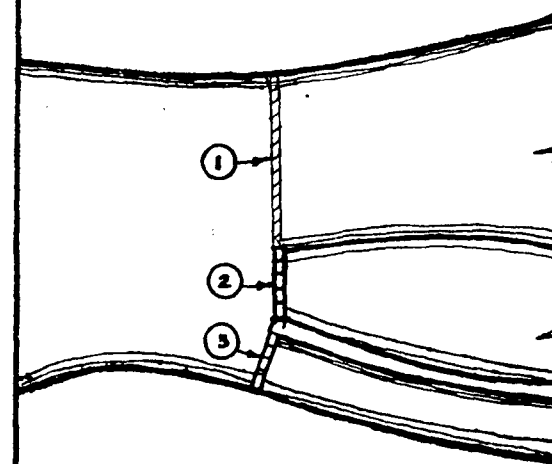
The member being shown the improvements to the branching of the two arms of the Palar River leading to the head sluices on either flank.

FIG. 1

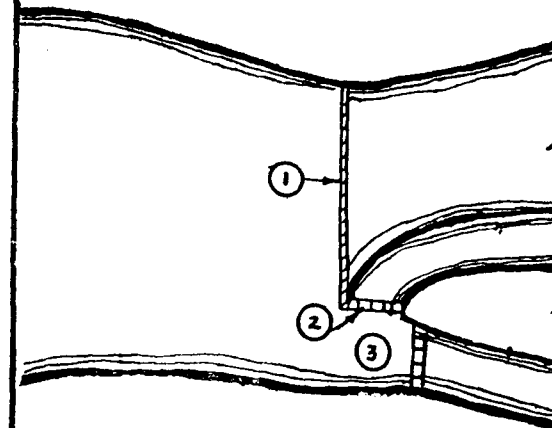
THE THREE DIFFERENT LAY-OUTS
OF ANICUT SYSTEM TESTED IN
THE MODEL



LAY-OUT - 1



LAY-OUT - 2

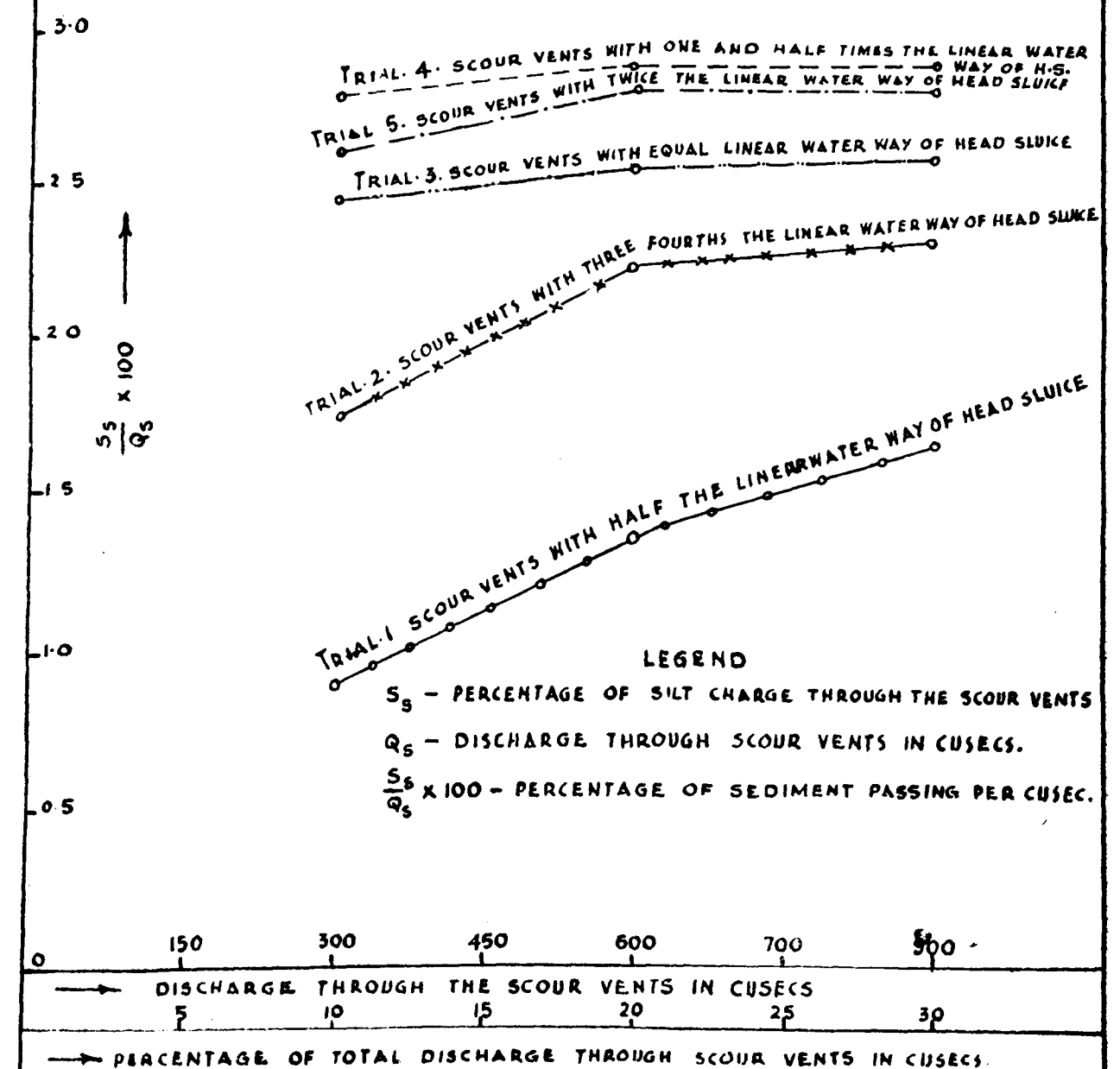


LAY-OUT - 3

- ① ANICUT
- ② SCOUR VENT
- ③ HEAD SLUICE

FIG. 2

RELATIONSHIP BETWEEN THE SILT CHARGE AND DISCHARGE
THROUGH SCOUR VENTS FOR LAYOUT-1. IN FIG. 1





The Polish team on Cellular Concrete Project observing the working of the unconfined compression testing machine fabricated in our laboratories at Chepauk.



The Polish team getting interested in the model of a new type of breast wall.

PUMPING FROM RIVERS AND WELLS ADJOINING IRRIGATION CANALS.

A NOTE ON THE EXISTING REGULATIONS.

BY

* SRI K. V. EKAMBARAM, I.S.E.,

Pumping for irrigation purposes may be broadly classified into two categories:—

(1) Pumping water from rivers, channels and drains, i.e., directly pumping the waters flowing on the surface.

(2) Pumping from wells adjoining the irrigation canals, i.e., pumping from the water table which is also supplemented by influent seepage from the irrigation canals.

I. (i) In the first category is included pumping from the Cauvery and Bhavani Channels. There were a number of Government Orders regarding installation of pumpsets on banks of rivers and channels and Government examined in the year 1955 'de novo', the question relating to pumping from the Cauvery Basin in a comprehensive manner with a view to evolve a common policy, so that there might be no reasonable ground for cries of discrimination from any quarter and issued the following orders in G.O. Ms. No. 3300, Public Works, dated 27th August 1955:—

(a) No new pumps should be allowed to be set up on any of the channels except under permits.

(b) The existing authorised and unauthorised pumps will be allowed to continue but they should on no account be used during the off-season. The Public Works Department should examine the availability of water for expansion of the ayacut under each channel and report to

the Collector the approximate area that may be given supply. The areas so reported should be distributed by the Revenue Department to the owners of the existing authorised and unauthorised pumps in proportion to the areas now irrigated by them. There may be hard cases for e.g., where ryots take water due to percolation, etc., these cases should be considered on merits by the Collectors.

The Collectors should prepare and maintain a register to show the existing ayacut under the channel and the expanded ayacut allowed to the pumpset holders in the relevant survey numbers. The Revenue officials should be instructed to inspect these areas to see that there is no further unauthorised irrigation.

(c) There should be no restriction on the nature of crop raised in any area for which irrigation was allowed. But it should strictly be understood that no water would be permitted to be taken in the off-seasons and that lift irrigation by pumps should be allowed only during the irrigation season.

(d) All pending prosecutions should be withdrawn and penal assessment levied restricted to ten times the normal assessment. In cases where full penal assessment has been collected any excess over ten times the assessment, should be refunded.

(ii) With reference to conversion of bullock lifts to pumping, the following orders were

* Chief Engineer for Irrigation, Madras.

issued in G.O. Ms. No. 3727, Public Works, dated 1st September 1956.

(a) In cases of installation of pumpsets where the lands cultivated are registered baling wet lands and where permits have been given for bullock lifts, the Collectors should change the permits from bullock lift to mechanical lift straightaway after consulting the Executive Engineers concerned. Penalty need not be levied in these cases and any penalty already levied should be completely refunded.

(b) Cases of installation of pumpsets with permits previously given for bullock lifts, where the areas cultivated are not registered wet lands, but the extents do not exceed those allowed under the permits for bullock lifts, should be treated as 'Authorised' and the Collectors should issue revised permits for mechanical lift in consultation with the Executive Engineer concerned, after the apportionment ordered in the G.O. Ms. No. 3300, Public Works, dated 27th August 1955 has been made. Penalty need not be levied and any penalty already levied should be completely cancelled in these cases also.

(c) In cases where the pumpsets irrigated larger extents than those allowed under the permits for bullock lifts, the whole extents brought under pump irrigation (including the areas which were previously under bullock lift) should be treated as 'unauthorised' and penalty should be levied, till the additional area that can be allowed under the channels is determined by the Public Works Department and apportioned by the Collector among the pumpset holders. In all these cases also, all pending prosecutions should be withdrawn and penal assessment levied should be restricted to ten times the normal assessment. In cases where full penal assessment has been collected, any excess over ten times the assessment should be refunded.

(iii) The next and most important G.O. is G.O. Ms. No. 3365, Public Works, dated 16th October 1957, in which the first G.O. Ms.

No. 3300, Public Works, dated 27th August 1955, has been read. The main provisions of this G.O. are :—

(a) For delta drains and certain channels which act more as drains with only small irrigation under them, the Superintending Engineer, can permit the pumping with suitable conditions such as (i) no cross bund to be provided across the drain, (ii) extent of ayacut to be limited to the minimum surplus available in scarcity period over the need of the regular ayacut etc., etc.

(b) In the case of rivers, channels, and drains other than those covered by item (a) permission for pumping must be sanctioned by Government only, the main conditions governing the issue of permit being:—

(1) Pumping can generally be allowed during August to December; (2) Horse power of engines for each permit not to exceed 3 HP. and size of pump not to exceed 3 inches; (3) No individual permit to exceed 6 acres; (4) Only food crops can be grown and not cash crops; (5) Total area to be permitted for pumping under a channel should not exceed 5 per cent of the registered ayacut under the channel; (6) No pumping should be permitted near the tail-end of a channel, say, the last 3 or 4 miles, the aggregate ayacut in which reach is less than 15 per cent of the total registered ayacut and etc.

(iv) In subsequent G.Os. No. 1594, dated 25th March 1959 and G.O. Ms. No. 56, dated 7th January 1960, Government approved the regularisation of pumpsets installed before 27th August 1955, on the banks of Raja, Kumara-palayam and Mohanur channels in Salem District subject to certain conditions. When conditions are formulated, the pumpset holders represented and suggested certain modified conditions for the regularisation of pumpsets in these channels. Government have examined the matter and approved in G.O. No. 1536, dated 13th June 1961 the following important conditions

to regularise the unauthorised pumpsets in the above channels:—

1. Sluice of suitable size with locking arrangements should be provided at the mouth at the cost of the parties concerned and the work should be executed by P.W.D. as full contribution work or by ryots under the supervision of Public Works Department.

2. The H.P. and size of the suction and delivery pipes of oil engine pumpsets need not be disturbed.

3. If electrical pumpsets are used the H.P. and size of suction and delivery pipes should not exceed 7.5 and 4 inches by 3 inches respectively and the maximum extent allowed is 15 acres.

4. If pumpset holders increase the area of irrigation or irregular irrigation is resorted to by open cuts, the supply to the particular pumpset will be completely cut-off, the leading channel obliterated and irregular irrigation heavily penalised.

5. When oil engines are converted into electric motors the H.P. and the size should be changed in accordance with condition (3) within a period of one year and 6 months respectively from the date of grant of permit, and

6. Pumping from channels will be allowed throughout the year except during the period when the channels are closed for repairs and during times of short supply when preference will be given to regular registered ayacut.

(v) A conference was held on 25th September 1961 to discuss the desirability to regularise further unauthorised pumpsets not governed by the above Government Orders (i.e., pumpsets installed after 27th August 1955) and the question of penalty to be levied in the case of unauthorised pumpsets.

In the conference, it was generally accented that all the pumpsets installed up to 2nd October 1961, except those within four miles of tail-ends of channels could be regularised by the

Collectors themselves subject to the conditions that the availability of water should be certified by the Executive Engineers concerned and there should be no increase in the ayacut served by these pumpsets. It was also accepted that in the case of Kalingarayan channel the restriction on pumpsets within four miles of tail-end of the channel need not be imposed in view of considerable seepage water being available from the Lower Bhavani Project ayacut.

(vi) Government have accepted the above recommendations in G.O. No. 3339, dated 12th December 1962 (in which all the above G.Os. have been read) subject to the conditions similar to those already approved in G.O. No. 1536, dated 13th June 1961. In addition the following conditions have also been stipulated, viz:—

(i) A deterrent penalty of 20 times the normal water-cess should be levied for any irregular irrigation by pumpsets installed after 2nd October 1961.

(ii) No unauthorised pumpsets should be regularised within four miles of the tail-ends of the channels including the 37 cases situated within four miles from the tail-ends of the Cauvery channels in Salem District.

(iii) During scarcity periods when there are turns in the channels, the ryots under the pumpsets should also be subject to rationing of supply, as the others.

Regarding the question of regularising the conversion of bullock lifts into mechanical or electrical lifts, the following additional conditions were also imposed in the above Government Order:—

1. The conversion should have taken place on or before 2nd October 1961.

2. The Area already permitted for irrigation by bullock lift should not be increased.

3. The suction and delivery pipes should be fixed with sizes as indicated in the orders already in force.

4. In the case of baling wet lands

(a) Conversion to oil engine of 5 H.P. or less or electrical pumpset of 5 H.P. or less will be freely allowed with the usual restrictions on suction and delivery pipes.

(b) For the lifetime of an oil engine of higher than 5 H.P. now installed a normal penalty of one extra water rate should be levied and when it is replaced due to wear and tear replacement must be a 5 H.P. oil engine or 5 H.P. electric pumpset. The suction and delivery pipes should also be stepped down then to the standards now in force as may be applicable to a 5 H.P. pumpset.

(c) No unauthorised conversion to an oil engine or electric pumpset exceeding 5 H.P. should be allowed or permitted after 2nd October 1961.

The Board expressed the idea that there may still be a number of cases of bullock lifts to be converted into electrical or mechanical lifts and recommended that such cases also may be permitted. Government have approved this also in this Government Order.

Government also approved Chief Engineer's (Irrigation) recommendation that a register showing the location of pumpsets, names of water courses, names of owners of the pumpsets, H.P. of pumpsets, the extent irrigated, special conditions for pumping and other relevant particulars should be maintained by the Collectors concerned and made available to the Board of Revenue, Chief Engineer (Irrigation) and other local Public Works Department Officers.

(vii) Certain areas which originally were benefitted by pumping from Cauvery but subsequently absorbed within the ayacut of Mettur canals were allowed to pump from Cauvery also—vide G.O. Ms. No. 2158, Public Works, dated 21st July 1959, provided such pumpsets were in existence prior to 27th August 1955, subject to certain conditions as:—

(a) Water should not be taken during the off-season (i.e., 29th January to 8th June or the actual date of closure and opening of the Mettur Reservoir)

(b) the existing area of irrigation under each pumpset should not be increased;

(c) only food crops should be raised under the ayacut of each pumpset; and

(d) details regarding the horse power, size of pipes, etc., should be worked out at the time of issuing permits and what are actually required with reference to individual requirements and local conditions should be adopted in consultation with Public Works Department.

In letter No. 195/61.B-1, dated 18th April 1961, to the Board, Chief Engineer (Irrigation) has agreed with the Collector to allow 42 pumpsets irrigating an extent of 417 acres in Tiruchengode and Sankari taluks included in the Mettur canal system (installed on the Cauvery bank) to take water from the Cauvery during the off season also, the quantity involved being of the order of 7 cusecs only. Government in Memorandum No. 3430-N/61-3, dated 23rd August 1961 ordered that the conditions in G.O. No. 1536, dated 13th June 1961 holds good for these cases also.

(viii) *Tambaraparani system*.—(a) Government have ordered in G.O. Ms. No. 1716, Public Works, dated 9th June 1960 that permission to instal pumpsets for baling water for irrigation of lands registered as *baling wet lands* may be granted by the Collector subject to the condition that H.P. of all such pumps, is limited to $\frac{1}{2}$ H.P. per acre and subject to a maximum of 5 H.P. per set.

(b) Government have ordered in G.O. Ms. No. 777, Revenue, dated 19th February 1962 that permission may be granted to the ryots under the Manimuthar Project including Tambaraparani to sink new wells and to deepen the existing wells subject to conditions that the wells should be two furlongs away on either side from the main canal and one furlong away from the distributaries of Manimuthar Project including the Tambaraparani System.

(ix) *Kodayar System*.—Generally no permission has been granted for installation of

pumpsets in the Kodayar system. But at critical times, the Executive Engineer, Kanyakumari Division has given permission to instal oil engine pumpsets (with the concurrence of the Collector) for saving the standing crops in the registered ayacut and such pumpsets installed temporarily would be removed immediately after the specific period for which permission was granted. The Government have also ratified this in G.O. Ms. No. 170, Public Works, dated 19th January 1961.

(x) Except for the cases referred to above there are no approved rules governing direct pumping from other rivers and streams. This means no pumping is allowed in these rivers and channels and every fresh case must be specially referred to Government for orders. (The case of the Palar is being discussed separately at the end of the note).

II. (i) In the case of Project Systems (put into operation during the Plan periods) as *Lower Bhavani Project, Amaravathi, Mettur Canals, Vaigai, Sathanur, Vidur and Manimuthar*, we have recommended pumping from wells subject to certain conditions. *the important condition for pumping from wells being, that the wells should not be within two furlongs from the Main Canal and one furlong from the distributory.* In addition to these conditions, certain other conditions were also stipulated for some of the project systems as detailed below:—

(a) *Mettur Canals, Sathanur and Vidur*.—The H.P. of the pumpset should not exceed Five.

(b) *Vaigai Project*.—(i) Only a limited number of wells will be allowed to have pumpsets.

(ii) The H.P. of the pump should not exceed five.

(c) *Manimuthar Project*.—The H.P. of the pump should not exceed five.

Note.—Relaxation with reference to two furlongs and one furlong limit has been recommended to be allowed for certain existing wells (11 Nos) for which electric power has been sanctioned already and these are permitted in G.O. Ms. No. 21, P.W., dated 3rd January 1962.

(ii) Government orders have been issued for the following cases:—

Lower Bhavani Project.—G.O. Ms. No. 2030, P.W., dated 7th July 1959.

Amaravathy Project.—G.O. Ms. No. 3194, Rev., dated 5th August 1960.

Mettur Canals.—G.O. Ms. No. 732, P.W., dated 8th March 1960.

Vaigai and Manimuthar.—G.O. Ms. No. 21, P.W., dated 3rd January 1962.

Sathanur Project.—G.O. Ms. No. 2046, P.W., dated 8th April 1960.

(In the case of Amaravathi, the orders are for sinking of new wells and this is treated on a par with pumping from wells.)

Orders pertaining to Sathanur and Vidur are awaited. In the case of Lower Bhavani Project and Amaravathi we have also recommended to Government (in this office No. 4510/57 N-43, dated 18th November 1960 and 862/60-N-4, dated 20th July 1960) to stipulate the following additional conditions such as:—

(i) H.P. of the each pumpset should not exceed five, etc.

(ii) the power should be utilised for the irrigation of crops permitted in the project area by Government from time to time.

(iii) supply will be cut off if it is used for purposes other than those for which it has been specifically sanctioned.

Government have approved this in G.O. No. 2413, Public Works, dated 6th September 1962, in the case of Lower Bhavani Project. In Chief Engineer's (Irrigation) letter No. 5731/56 N-67, dated 27th June 1962, it was recommended that installation of pumpsets for unlimited pumping from all the wells inclusive of pumping during non-irrigation season might be permitted under the Amaravathi Project subject to the condition that the wells should be two furlongs away from the main canal and one furlong from the distributory. As regards sugarcane area Government have already permitted ryots to construct wells and use pumpsets only in the area localised for sugarcane cultivation in Government Revenue Department Memorandum No. 9936/N3/58-3, dated 3rd September 1959.

As the distances specified will not apply to the localised sugarcane area, pumping without limitations in the distances has been recommended to be restricted only for sugarcane crop and not for raising any other crop. The other condition to be stipulated is that the H.P. of the pump should not exceed five. Orders of Government are awaited on this.

In the case of Lower Bhavani Project, Board has also approved and recommended to Government the suggestions of Chief Engineer (Irrigation) that the tail-end reach of main canal below the regulator 74/2 may be treated as distributory for the purpose of granting permission to sink new wells or for the installation of electric pumpsets as the carrying capacity of the canal below this regulator is less than the carrying capacity of the biggest distributory above the regulator (vide Board's letter No. 2772/61-4, dated 15th January 1962) and Government orders are awaited.

Similar relaxation has also been recommended for other projects also in this Office letter No. 2847/60. N-32, dated 12th September 1962, to Government through Board of Revenue. Government approval is awaited.

(iii) In the case of the other project systems (Pullambadi and New Kattalai) we have not so far referred to Government any case concerning these areas. With regard to Krishnagiri, Government have passed orders that sinking of new wells or deepening of old wells should not be done if the wells are within two furlongs from the Main canal and one furlong from the distributories (vide Government Memorandum No. 80382-H3/59-3, dated 17th November 1959). Though Government orders do not refer to pumping, yet sinking new wells is always treated on a par with pumping from wells and hence the same restrictions hold good for pumping also.

(iv) In the case of Periyar canals system, it was recommended to Government that pumping from wells may be permitted subject to the conditions stipulated for the Vaigai Project. Government approved this in G.O. No. 847, Public Works, dated 24th March 1962.

(v) In the case of Mettur canals there were several representations for removal of ban on pumping within the prohibited distance of two furlongs and one furlong limit, when the supply to Mettur Canals is closed. This was discussed by the Chief Engineer (Irrigation) with the Minister for Electricity on 13th December 1960 and it was decided that with reference to pumping from wells within the prohibited distance of two furlong limit, this can be allowed only during the non-irrigation season and subject to an upper limit of 5 H.P. for each pumpsets and the Electricity Board will have to arrange to cut off electric supply to the pumpsets in the prohibited area during irrigation season as working of pumpset during irrigation season will be detrimental to the supply of water to the tail-end ayacut of the canal system especially during scarcity periods when turn system is adopted.

(vi) Government also raised a question that during irrigation season there will be plenty of water in the Mettur Reservoir and in the canals and the ryots will have no necessity to take to pumpings from wells for the regular ayacut and even if pumping is done during irrigation season from wells within the prohibited distance in lands not commandable by irrigation channels the effect of water supply will not be materially affected.

It was reported to Government that even if the reservoir is full the canals can carry only a particular discharge for which they are designed with reference to ayacut under them and the duty adopted. If pumping is allowed within the prohibited distance tail-end areas may suffer though full discharge is allowed in the canal at head—further during the time of low storage in the reservoir supply will have to be restricted by imposing a cut. If pumping is allowed under such conditions, the situation will be worse for the tail-end areas. It is only to avoid this the condition that no pumping in the prohibited area is to be allowed during irrigation seasons has to be imposed. If this condition cannot be enforced the best course will be not to allow pumping from any wells at all within two furlongs from the main canal and one furlong from distributories either during or after irrigation season.

III. Though there are specific Government Orders in regard to ban on sinking of wells and installation of pumpsets in respect of individual projects, Government in Memorandum No. 793-N3/59-27, dated 29th November 1961, suggested some general conditions for the supply of electric energy to the pumpsets installed in the ayacut of all irrigation systems and requested Chief Engineer (Irrigation) to offer remarks on this. The important conditions are (1) wells situated within two furlongs from the main canal and one furlong from the distributaries will be given electric supply for pumping subject to conditions that no pumping will be done during irrigation season and (2) No well will be allowed to have pumps of more than 5 horse power capacity, etc.

(i) Though the above conditions were agreed to it was reported that the Electricity Board considered it illegal and impracticable to cut-off supply during irrigation season [as suggested in condition (1)] when once power supply is given and hence suggested deletion of this condition.

On this it has been reported to Government that as already for Mettur canals if the above condition cannot be enforced the best course will be not to allow pumping from wells within the prohibited distances either during or after irrigation season. Government have since accepted Chief Engineer's (Irrigation) views and ordered in G.O. Ms. No. 838, Public Works, dated 15th March 1963, that no well situated within two furlongs of any irrigation canal or one furlong of any distributory shall be given electric supply for pumping. The other conditions as recommended in Chief Engineer's (Irrigation) letter No. 7438/58. A-8, dated 11th January 1962, have also been accepted in this Government Order. This Government Order holds good in the case of Mettur canals scheme and also to the canal irrigation systems like Manimukthanadhi, Vellar, Gadilam, etc.

But while passing orders on the report of the *ad hoc* committee regarding rural electrification and rural development. Government in G.O. Ms. No. 3123, Public Works, dated 21st November 1962, have ordered that "no relaxation of the restriction in force is necessary with

the proviso that pumping from wells within the prohibited distance will be allowed during the off-season."

Palar Basin.—In the case of Palar Basin, originally a total ban on further development of irrigation was contemplated. The Committee constituted by Government in G.O. No. 1617-1, dated 19th June 1931, held that Palar was already overburdened with irrigation and that no dry land should be converted into wet and no single crop land into double crop, etc.

Subsequently in G.O. Ms. No. 3985, dated 6th October 1948, irrigation of dry land was permitted under wells located outside 2,000 feet from existing spring heads, etc. After a good North-East Monsoon when storage in tanks and channels are good, irrigation of dry lands are also permitted outside the *periphery* of the wet ayacut.

Another relaxation in G.O. Ms. No. 1597, Public Works, dated 9th April 1953, is for irrigation of wet lands from new wells if these lands are in the existing ayacut.

Further representations were received from ryots to the effect that the limit of 2,000 feet must be reduced to 1,000 feet, etc. It was recommended to Government that this distance of 2,000 feet from any spring head is absolutely necessary and Government finally issued orders agreeing with the above suggestion. Government in G.O. No. 3024, dated 22nd October 1959, have further ordered that this restriction should not be relaxed *except in deserving cases* which is to be defined clearly.

The Chief Engineer (Irrigation) after his inspection of the Palar Basin, has recommended in No. 4302/58. H-8, dated 10th January 1961, that pumping from wells may be permitted in the Palar Basin, provided such wells are two furlongs away from the spring heads of channels and one furlong away from the spring channels and provided that the crops grown correspond to the classification of the land registered as single crop wet, double crop wet, dry, etc., and also provided that the horse power of the pumpset does not exceed five. Government have also issued the orders, incorporating Chief Engineer's (Irrigation) recommendation in G.O. Ms. No. 1198, Public Works, dated 6th May 1961.

G.O. Ms. No. 3300, Public Works, dated 27th August 1955.

[SUBJECT.—Irrigation—Pumping from Cauvery and Bhavani channels—Grant of permission—Kinds of crops to be permitted—Vesting of channels with Revenue Department—Policy—Orders issued.]

READ—the following papers:—

G.O. Ms. No. 4551, Public Works, dated 8th November 1952.

G.O. Ms. No. 2094, Public Works, dated 12th May 1953.

G.O. Ms. No. 4005, Public Works, dated 8th October 1953.

G.O. Ms. No. 634, Public Works, dated 26th February 1954.

ORDER.

The question of pumping of water from irrigation channels for the purpose of irrigating dry lands and for growing sugarcane has come up for consideration of the Government in the case of certain Cauvery and Bhavani channels in Tiruchirappalli, Coimbatore and Salem districts and in this connection the vesting of the channels in the Revenue Department has also been raised. The channels concerned are:—

(1) The Kalingaroyan channel in Coimbatore district.

(2) The Pugalur channel in Coimbatore and Tiruchirappalli districts.

(3) The Raja and Komarapalayam channels in Salem district.

(4) The Mohanur channel in Salem district.

(5) The Nerur channel in Tiruchirappalli district.

(6) The Kattalai High Level Channel in Tiruchirappalli district.

The channels (2) and (5) are in charge of the Revenue Department and the rest are under the control of the Public Works Department. In the case of Cauvery and its tributaries, utilisation of their waters is to a large extent governed by the Madras-Mysore Agreement is also the need for conserving all available water to the age old ryots of the old Cauvery delta lands. In view of the limitations of availability of water in the channels, difficulty arises on account of overdrawal of water by pumping in certain reaches and objections have been raised against such pumping on behalf of regular ayacutdars lower down owning wet lands and depending on irrigation by flow. The agitation against pump irrigation has been greatest in regard to the first three channels.

2. In the case of the three channels, viz., (1) the Kalingaroyan channel, (2) the Pugalur channel, and

(3) the Raja and the Komarapalayam channels, installation of pumpsets was permitted initially as a Grow More Food measure. Though some conditions such as raising only food crops, etc., had been imposed in granting the permit for pumpsets, these conditions were soon violated because the pumpset owners found it more profitable to grow sugarcane and other commercial crops. In course of time, more and more pumpsets came to be set up, several of them unauthorisedly and they commenced working without obtaining any sort of permission. These pumps were generally installed in the higher regions of the channels to irrigate dry lands and their continued working, particularly during the periods of low supply, began to drain off the supply normally allowed to the tail-end ayacut wet lands for growing a second crop. Attempts were then made to regulate the working of the pumps or stop them altogether by the cancellation of their permits, levy of penal water rates and even criminal prosecutions where such a course was considered necessary, but the pumpset holders have not been deterred by these measures and the pumps are being worked even now and the owners are pressing for the grant of permits.

3. In the circumstances the Government have examined *de novo* the questions relating to pumping from the Cauvery basin in a comprehensive manner with a view to evolve a common policy so that there might be no reasonable ground for cries of discrimination from any quarter and they pass the following orders:—

(i) *Installation of new pumps.*—No new pumps should be allowed to be set up on any of the channels except under permits.

(ii) *Existing authorised and unauthorised pumps.*—The existing authorised and unauthorised pumps will be allowed to continue but they should on no account be used during the off-season. The Public Works Department should examine the availability of water for expansion of the ayacut under each channel and report to the Collector the approximate area that may be given supply. The area so reported should be distributed by the Revenue Department to the owners of the existing authorised and unauthorised pumps proportion to the areas now irrigated by them. There may be hard cases for example, where ryots take water due to percolation. These cases should be considered on merits by the Collectors.

The Collector should prepare immediately and maintain a register to show the existing ayacut under the channel and the expanded ayacut allowed to the pumpset holders with the relevant survey numbers. The Revenue officials should be instructed to inspect these areas to see that there is no further unauthorised irrigation.

(iii) *Permission for sugarcane cultivation.*—There should be no restriction on the nature of crops, raised in any area for which irrigation was allowed. But, it

should strictly be understood that no water would be permitted to be taken in the off-season and that lift irrigation by pumps should be allowed only during the irrigation season.

(iv) *Transfer of channels to Revenue Department.*—The proposal for transfer of those channels which are now under the control of the Public Works Department, to the Revenue Department will be kept in abeyance for the present.

(v) *Pending prosecutions.*—All pending prosecutions should be withdrawn and penal assessment levied restricted to 10 (ten) times the normal assessment. In cases where full penal assessment has been collected, any excess over 10 (ten) times the assessment should be refunded.

A question was raised whether in the case of permits given for lifting of water by bullocks the installation of pumps should be penalised even though the pumps irrigate only the same area as that allowed for bullock lift. Separate orders will be issued in regard to this question.

(vi) *Pumping from the Cauvery river.*—The question of permitting the pumping of water from the Cauvery river directly will be examined later on. In the meanwhile, the existing pumps will be allowed but no new pumps should be permitted.

4. The Chief Engineer (Irrigation) and the Board of Revenue are requested to issue necessary instructions for the immediate implementation of the above orders of Government and for the disposal of the pending cases in the light of these orders.

(By order of the Governor)

R. M. SUNDARAM,
Secretary to Government.

To the Board of Revenue.
„ the Chief Engineer (Irrigation).

G. O. Ms. No. 3727, Public Works, dated 1st September 1956.

[SUBJECT.—Irrigation—Pumping from Cauvery and Bhavani channels—Installation of pumpsets with permits given for lifting water by bullocks—Penalising of—Orders passed.]

READ—the following papers:—

G.O. Ms. No. 3300, Public Works, dated 27th August 1955.

Memorandum to the Board of Revenue, Ref. No. 25570-N/55-10, Public Works, dated 27th August 1955.

Letter from the Collector of Salem to the Board of Revenue, dated 9th October 1955, Roc. No. 25652/53. H-3.

Letter from the Collector of Tiruchirappalli to the Board of Revenue, dated 20th October 1955, Roc. No. A4. 28140/55.

Letter from the Collector of Coimbatore to the Board of Revenue, dated 15th November 1955, No. 20868/55 C-9.

Letter from the Chief Engineer (Irrigation) to the Board of Revenue, dated 6th April 1956, No. 560/55 C-27.

From the Board of Revenue, B.P. Mis. No. H. 633/56, dated 10th May 1956.

ORDER.

In sub-paragraph 2 of paragraph 3 (v) of the G.O. Ms. No. 3300, Public Works, dated 27th August 1955, it was stated that separate orders would be issued in regard to the question whether in the case of permits given for the lifting of water by bullocks, the installation of pumps should be penalised even though the pumps irrigated only the same area as that allowed for bullock lift. The Board of Revenue was asked to offer its remarks on the question in consultation with the Chief Engineer (Irrigation) and the Collectors concerned. The Board of Revenue has examined the question in consultation with the Collectors of Salem, Coimbatore and Tiruchirappalli and Chief Engineer (Irrigation). The Chief Engineer (Irrigation) and the Collectors consider that there is no need to penalise the change over from bullocks to pumps so long as the area now irrigated is not increased. The Chief Engineer (Irrigation) and the Collector of Tiruchirappalli have suggested that the horse-power of the pumpset may be limited and that the size of the pump and the working hours may be restricted to avoid excessive pumping of water. The Board of Revenue has agreed with the above suggestion and has recommended that the permission to instal and work pumpsets in cases of such change-over may be granted subject to the additional condition that the permission is liable to be cancelled if there is any unauthorised extension of irrigation under these pumpsets or any violation of the conditions stipulated in this behalf.

2. The Government have examined the above recommendations and they direct as follows:—

(i) In cases of installation of pumpsets with permits previously given for bullock lift, where the lands cultivated are registered baling wet lands, the Collectors

should change the permits from bullock lift to mechanical lift straight away after consulting the Executive Engineers concerned. Penalty need not be levied in these cases and any penalty, already levied should be completely cancelled.

(ii) Cases of installation of pumpsets with permits previously given for bullock lifts where the areas cultivated are not registered wet lands, but the extents do not exceed those allowed under the permits, for bullock lift should be treated as 'authorised' and the Collectors should issue revised permits for mechanical lift in consultation with the Executive Engineer concerned after the appointment ordered in paragraph 3 (ii) of G.O. Ms. No. 3300, Public Works, dated 27th August 1955 has been made. Penalty need not be levied and any penalty already levied should be completely cancelled in these cases also.

(iii) In cases where the pumpsets irrigate larger extents than those allowed under the permits for bullock lifts, the whole extents brought under pump irrigation (including the areas which were previously under bullock lift) should be treated as 'unauthorised' and penalty should be levied till the additional area that can be allowed under the channels is determined by the Public Works Department and apportioned by the Collector among the pumpset holders as ordered in paragraph 3 (ii) of G.O. Ms. No. 3300, Public Works, dated 27th August 1955.

In all these cases also, all pending prosecutions should be withdrawn and penal assessment levied should be restricted to ten (10) times the normal assessment. In cases where full penal assessment has been collected, any excess over ten times the assessment should be refunded.

3. The Government also direct that the restrictions and conditions recommended by the Chief Engineer (Irrigation), the Collector of Tiruchirappalli and the Board of Revenue referred to in paragraph 1 above be applied to all the above cases subject to the proviso that no excess over the extent irrigated under bullock lift previously will be allowed even if possible with the above restriction. All cases of issue of permits for the first time after issue of G.O. Ms. No. 3300, Public Works, dated 27th August 1955 should come up to the Government for approval.

(By order of the Governor)

S. K. CHETTER,
Secretary to Government.

To the Board of Revenue,
„ the Chief Engineer (Irrigation).

G. O. Ms. No. 3365, Public Works, dated 16th October 1957.

[SUBJECT.—Irrigation—Installation of pumpsets for pumping from rivers and from Cauvery and Bhavani channels and other irrigation channels—Grants of permits—Procedure—Orders issued.]

READ—the following papers:—

From the Board of Revenue, dated 28th December 1951, Reference No. H. 2089/51-2.

Letter from the Chief Engineer (Irrigation), dated 26th June 1954, No. 359/52. B-11.

From the Board of Revenue, dated 28th May 1955, B.P. Ms. No. 621/55.

G.O. Ms. No. 3300, Public Works, dated 27th August 1955.

From the Board of Revenue, dated 8th December 1955, B.P. Ms. No. 1571 and, dated 4th April 1957, B.P. Ms. No. 451.

Order.—No. 3365, Public Works, dated 16th October 1957.

The question as to the criteria and the conditions to be laid down for issue of permits for installation of pumpsets for irrigation purposes has been under the consideration of Government for some time now. With reference to paragraph 3 (1) of G.O. Ms. No. 3300, Public Works, dated 27th August 1955 directing that no new pumpsets should be allowed to be set up on Cauvery and Bhavani channels except under permits the question of the authority to issue the permits for installation of pumps and the procedure to be followed therefor also required consideration. The Government, after examining the question in consultation with the Chief Engineer (Irrigation) and the Board of Revenue, direct as follows:—

(1) *Pumping from delta drains.*—In the case of pumping from delta drains, the Superintending Engineer, may grant permits with suitable conditions. Applications for pumping from delta drains arise only in the Thanjavur delta. Some of the old branches of the Cauvery in the delta act both as supply channels and as drainage carriers. In these cases, no pumping should be allowed except where irrigation is small and it acts only mostly as drain. In recent years, however, some drains have been excavated solely for drainage and in these cases, pumping can be permitted subject to the following conditions:—

(a) No cross bund should be put across the drain and no banking is to be done to the leading channel from the drain to the pumping installation.

(b) No other obstruction such as masonry walls or planks should be put up which would interfere with the free flow in the drain.

(c) No request for supply of irrigation water through the drain will be complied with and the irrigation undertaken by pumping from the drains is entirely at the party's risk.

(d) Extent of ayacut of pump should be restricted to the minimum surplus available in scarcity period over the need of the regular ayacut.

(2) Irrigation by pumping should not commence before one month from the date of supply to the delta lands or 1st of August every year, whichever is later.

2. Except the cases of pumping from delta drains referred to in paragraph 1 above, all other cases of permits for pumping from rivers or channels, whether they are Public Works Department sources or non-Public Works Department sources, should come up to Government. In such cases, the Collector should submit a report in consultation with the Public Works Department in all cases relating to Public Works Department sources and other cases, if necessary with full particulars of the case and his specific recommendations. The following criteria and conditions should be adopted before recommending any case of pumping:—

(a) Whether any water is drawn by the channel surplus to the requirements of its ayacut, which will otherwise be wasted, if not utilised for irrigation.

(b) Whether steps have been taken by way of repairs and improvements to the channel to prevent such waste and utilise the waters for irrigation.

(c) With the water so saved, is it not possible to get new lands which can be irrigated by direct flow, as such irrigation is more economical for the country than lift irrigation.

(d) Only after (a), (b) and (c) are satisfied can any irrigation by pumping be allowed, but even so, subject to the following conditions:—

(1) Pumping can generally be allowed during August to December.

(2) Horse-power of engines for each permit not to exceed 3 horse-power and size of pump not to exceed 3 inches.

(3) No individual permit to exceed 6 acres.

(4) Only food crops can be grown and not cash crops.

(5) Total area to be permitted for pumping under a channel should not exceed 5 per cent of the registered ayacut under the channel.

(6) No pumping should be permitted near the tail end of a channel say, the last 3 or 4 miles, the aggregate ayacut, in which reach, is less than 15 per cent of the total registered ayacut.

(7) All works connected with the installation shall be constructed and used in accordance with the scheme and specification approved by the Collector. Any alteration to the works ordered by the Collector shall also be carried out.

(8) The person in whose favour permission is granted, shall pay for the irrigation of the lands from the installation, a separate water-cess (i.e.), different from the water-cess charged in other cases at the rates for the time being in force in the district or taluk in which the installation is erected or the rates fixed by the Collector. The water-cess leviable under this condition is not in addition to the water-cess normally leviable under the rules.

(9) The Collector shall have power to revoke the permission without any compensation.

(10) If any land is irrigated with the aid of any pumping installation erected or used in contravention of any or all of the conditions imposed, such irrigation will be deemed to be irregular irrigation under the rules made under Act VII of 1865 and will be charged accordingly.

(11) The Executive Engineers, Subdivisional Officers and Section Officers of the Public Works Department and all officers of the Revenue Department of and above the rank of Revenue Inspectors shall have free access to inspect the installation at any time, in order to see that the conditions of permission are complied with.

3. The Revenue Department will be responsible for enforcing the conditions and they will be in charge of water distribution in the smaller channels. In every cases of permit granted by the Government the Collectors, shall on the infringement of any of the conditions, cancel the permit forthwith. The Collectors may renew the permits granted by the Government after they lapse, but not the permits cancelled by him for infringement, of any of the conditions. Cases of restoration of cancelled permits should be recommended to Government.

(By order of the Governor)

S. K. CHETTER,
Secretary to Government.

To the Collectors of all districts, except Madras.

„ all Executive Engineers.

Copy to the Board of Revenue (Land Revenue).

„ the Board of Revenue (Food Production).

„ the Chief Engineer (Irrigation).

G. O. Ms. No. 1594, Public Works, dated 25th May 1959.

[SUBJECT.—Irrigation—Raja, Komarapalayam and Kalingaroyan channels—Regularisation of irrigation pumpsets—Orders issued.]

READ—the following papers:—

G.O. Ms. No. 3300, P.W., dated 27th August 1955.

From the Collector of Salem, dated 19th March 1957, Roc. No. A4. 25652/53.

Letter from the Chief Engineer (Irrigation), dated 3rd May 1957, No. 5032/55-C-41.

Petition from Sri P. S. Nanjappa Gounder, dated 23rd July 1957.

Letter from the Chief Engineer (Irrigation), dated 27th November 1958, No. 5032/55-C-109.

Letter from the Chief Engineer (Irrigation), dated 23rd August 1957, No. 5032/55-C-51.

From the Board of Revenue, dated 24th March 1959, Reference No. H1. 1703/57.

From the Chief Engineer (Irrigation), dated 28th April 1959, U.O. No. 5032/55-C-115.

ORDER.

In G.O. Ms. No. 3300, P.W., dated the 27th August 1955, the Government laid down the policy in regard to the pumping of water for irrigation from the Cauvery and other channels. In paragraph 3 (ii) of the Government Order it was ordered that the Public Works Department should examine the availability of water for expansion of the ayacut under each channel and report to the Collector the approximate area that may be given supply and that the area so reported should be distributed by the Collector to the owners of the existing authorised and unauthorised pumps in proportion to the area now irrigated by them.

2. With reference to these orders, the Collector of Salem submitted the necessary proposals. The proposals of the Collector of Salem were examined in consultation with the Chief Engineer (Irrigation) and the Board of Revenue. The Board of Revenue in consultations with the Collector of Coimbatore and Collector of Tiruchirappalli has submitted the following recommendations:—

(1) All the authorised and unauthorised pumpsets as on 27th August 1955, installed in the Raja and Komarapalayam channels may be regularised after Chief Engineer (Irrigation) reports that the improvements to the channels have been completed.

(2) Sluices of suitable size with locking arrangements should be provided at the mouth of the leading channels at the cost of the parties concerned and the work may

be executed by the Public Works Department as full contribution work or by the ryots under the supervision of the Public Works Department.

(3) The horse-power of the pumps and the size of the pipes should be on the scale suggested by the Collector of Tiruchirappalli and agreed to by the Chief Engineer (Irrigation).

(4) The ryots may be given six months time to change the suction pipe to the prescribed size and one year time to change the capacity of the engine.

(5) In the case of new installation of electric pumpsets, copies of such orders should be marked to the local officer of the State Electricity Board by the Collector and the State Electricity Board should not give connection until the party produces the order from the Collector.

(6) No legislation is necessary to put down the installation of new unauthorised oil engine or electric pumpsets, as recommended by the Collector of Salem in view of the instructions issued in Government Memorandum No. 47, P.W., dated the 6th May 1957 and B.P. Mis. No. 1000, dated the 13th August 1958.

(7) The unauthorised and authorised pumpsets under Kalingaroyan channel as on 27th August 1955 may also be regularised subject to the conditions (2) and (6) above.

The Chief Engineer (Irrigation) has also since reported that most of the works have been completed and he has issued instructions for pushing through the remaining items of works.

3. The Government have examined the recommendations of the Board of Revenue. They accept recommendations (1), (2), (3), (4) and (7) in paragraph 2 above. The Board of Revenue and the Chief Engineer (Irrigation) are requested to issue necessary instructions for the immediate implementation of these orders. As regards recommendation No. (5) it is pointed to issue new permits. So in the case of new installations of electric pumpsets, copies of orders from the Government will be marked to the State Electricity Board and the Collector. Copies of these orders should then be communicated to the local officers of the State Electricity Board by the Collector and the State Electricity Board should not give connection till then. As regards recommendation (6) it is proposed to bring in legislation.

4. The Board of Revenue is requested to expedite the submission to Government or any further recommendations with reference to paragraph 3 of its reference cited.

(By order of the Governor)

(Signed)———,

Secretary to Government.

G. O. Ms. No. 1536, Public Works, dated, 13th June 1961.

[SUBJECT.—Irrigation—Raja, Komarapalayam and Mohanur channels and other channels—Regularisation of pumpsets installed prior to 27th August 1955—Further instructions—Issued.]

READ—the following papers:—

G.O. Ms. No. 3300, Public Works, dated 27th August 1955.

G.O. Ms. No. 3365, Public Works, dated 16th October 1957.

G.O. Ms. No. 1594, Public Works, dated 25th May 1959.

G.O. Ms. No. 56, Public Works, dated 7th January 1960.

From the Collector of Salem, Roc. No. 69545/59-A-4, dated 9th March 1960.

Letter from the Chief Engineer (Irrigation) to the Board of Revenue, dated 24th August 1960, No. 5032/55-C-146.

From the Chief Engineer (Irrigation) to the Board of Revenue, dated 15th October 1960, Reference No. 5032/55-C-148.

From the Board of Revenue, B.P. Rt. No. 1008, dated 13th February 1961.

ORDER.

In G.O. Ms. No. 3300, Public Works, dated 27th August 1955, the Government ordered that the authorised and unauthorised pumpsets installed on the banks of the Cauvery channels might be allowed to continue and that the Public Works Department should examine the availability of water for expansion of the ayacut under each channel and report to the Collector the approximate area that might be given supply so that the Collector might distribute the area so reported among the owners of the then existing authorised and unauthorised pumps in proportion to the area then irrigated by them. In G.O. Ms. No. 1594, Public Works, dated 25th May 1959, the Government approved the regularisation of the pumpsets on the banks of the Raja and Komarapalayam channels in Salem district subject to certain conditions. In G.O. Ms. No. 56, Public Works, dated 7th January 1960, the Government ordered that the conditions in G.O. Ms. No. 1594, Public Works, dated 25th May 1959, be extended to Mohanur channel. But when the Collector of Salem formulated the conditions with reference to the orders of Government, the pumpset owners represented to him that some of the conditions could not be accepted by them. Hence, in consultation with the pumpset holders, the Collector has proposed certain modified conditions for the regularisation of pumpsets installed on the banks of Raja, Komarapalayam and Mohanur channels and the report of the Collector has been forwarded to Government by the Board of Revenue with its own remarks and along with the remarks of the Chief Engineer (Irrigation).

2. The Government have examined the matter and direct that the following modified conditions proposed by the Collector of Salem and suitably revised by the Board of Revenue, be imposed for the regularisation of pumpsets installed on the banks of the Raja, Komarapalayam channels and Mohanur channel in Salem district and also to all other cases governed by the orders in G.O. Ms. No. 3300, Public Works, dated 27th August 1955.

(1) Sluice of suitable size with locking arrangements should be provided at the mouth of the leading channels at the cost of the parties concerned and the works will be executed by the Public Works Department as full contribution work or by ryots under the supervision of Public Works Department.

(2) (a) Where water is pumped by oil engines, there is no need to disturb the horse-power of the engine and size of the suction and delivery pipes.

(b) Where electric pumpsets are being used, the horse-power and size of the suction and delivery pipes be fixed as follows:—

	Horse-power.	Size of suction and delivery pipes.
Up to 3 acres	3	2" × 2½"
Up to 3 to 5 acres ..	3	2½" × 2½"
Up to 5 to 10 acres ..	5	3" × 3"
Up to 10 to 15 acres ..	7.5	4" × 3"

NOTE.—In such cases, where there are existing agreements, which give details of the Horse-Power of the engine or motor and the size of the suction and delivery pipes, the conditions of the old agreements may be continued subject to conditions (1) and (4) being fulfilled.

(c) If any pumpset holder increases the area of irrigation (normal extent to be as on 27th August 1955) the supply to that pumpset is liable to be cut off and the leading channel completely obliterated.

(d) Where irregular irrigation is resorted to by open cut or through side holes, the supply to that particular pumpset will be completely cut off the leading channel obliterated, and the irregular irrigation heavily penalised.

(e) When the oil engines are converted into electric motors, the Horse Power of the motor and the size of the suction and delivery pipes should be changed in accordance with condition (b).

(3) The suction pipe should be changed to the prescribed size in six months time and the capacity of the engine should be changed in one year's time from the date of grant of permit [in cases not coming under the purview of note under 2 (b) above].

(4) The extent of area of irrigation mentioned in the permit should not be exceeded.

(5) Water should be taken for irrigation generally only from August to December, of each year. Water will, however, be allowed throughout the year except

during the period when the channels are enclosed for repairs subject to the condition that during times of short supply preference will be given to regular registered ayacut.

(6) The Collector shall have the power to revoke the permission without any compensation.

8. The Government also approve in this connection, the *pro forma* suggested by the Collector of Tiruchirappalli and recommended by the Chief Engineer (Irrigation) and the Board of Revenue for regularisation of pumpsets. A copy of the *pro forma* is appended to this order.

(By order of the Governor)

E. P. ROYAPPA,
Secretary to Government.

To the Board of Revenue.

„ the Chief Engineer (Irrigation).

Enc.—One Annexure.

ANNEXURE.

FORM 1.

Report to be sent in the case of Pumpsets authorised or unauthorised but installed before 27th August 1955 in the Cauvery channels.

- 1 Serial number.
- 2 Name of the taluk.
- 3 Name of the village whether ryotwari or taken over estate or not taken over estate.
- 4 Name of the channel.
- 5 Total registered ayacut, under the channel (extent irrigated by direct flow and extent irrigated by baling to be furnished separately).
- 6 Total developed ayacut under the channel.
- 7 Total area (dry) available for apportionment among the owners of pumps, etc., used for irrigating dry lands.
- 8 Name of the pumpset holder (with proper address).
The serial number in the list furnished by the Executive Engineer and already communicated to the Tahsildar should also be furnished.
- 9 Horse-power of the pumpset and the size of the suction pump used by the owners and date of installation.

10 Whether the pumpset is used for irrigation of dry land or baling wet land.

11 Survey numbers of the lands irrigated by the pumpset.

12 Classification.

13 Total registered extent of the survey number.

14 Extent irrigated out of column 13 on 27th August 1955.

15 Whether authorised or unauthorised (the authority authorising the pumpset should be noted).

16 Whether there is any variation between any of these particulars furnished by the Executive Engineer and if so, the variation should be explained.

17 Whether the conditions for regularisation have been accepted by the pumpset owner (if so, his written consent statement to be obtained and enclosed).

18 Extracts of village accounts No. 6 and No. 2 for faslis 1363 and 1364 to show that the pumpset holder has taken water from the channel (to be enclosed).

19 Accompanied sketch showing the location of the pumpset and the lands irrigated by it (to be enclosed).

20 Extent with S.F. numbers and classification recommended for regularisation. (This should be done with reference to the availability of water for expansion of ayacut and with reference to the additional area available for apportionment among the pumpset holders).

21 Horse-power of the engine and the size of the suction pump recommended.

22 Reason for recommending the regularisation of pumpset.

23 Remarks (special conditions, if any, to be imposed, should be stated).

NOTE ON REGULARISATION OF AUTHORISED AND UNAUTHORISED PUMPSETS ON THE BANKS OF CAUVERY AND ITS CHANNELS

A Conference was held at 4 p.m. on 25th September 1961 to discuss about the pumpsets installed on the

banks of Cauvery, its tributaries, its branches and other channels, the effect of such pumpsets on a large scale, on the regular irrigation lower down; the regularisation of pumpsets with reference to the existing orders of Government, the desirability to regularise further unauthorised pumpsets not governed by those Government Orders (i.e., pumpsets installed after 27th August 1955) and the question of penalty in the case of unauthorised pumpsets, etc.

Government have in their D.O. No. 3365-N/61-11, dated 16th October 1961 have sent a copy of summary record of the proceedings of the conference and requested Chief Engineer's (Irrigation) remarks on this for issuing necessary orders.

Subsequently Government have also forwarded the recommendations of the Board of Revenue on the proceedings in D.O. No. 3365-N/61, dated August 1962 and requested specific remarks on Board's recommendations.

The remarks on the several suggestions made in the proceedings and also those by the Board of Revenue in respect of pumping from the several channels are discussed below.

Kalingarayan channel.—All the pumpsets that existed upto 2nd October 1961 may be regularised including those that are within 4 miles of tail-end of Kalingarayan channel in view of the considerable quantity of seepage water available from the Lower Bhavani Project Ayacut.

Bhavani and its channels.—The recommendation for converting all bullock lifts either to the electrical or mechanical pumpsets, existing on 2nd October 1961 may be accepted subject to the condition, that there is no extension of ayacut under each pumpset.

Amaravathi and its channels.—The investigation of remodelling of these channels is in progress. In the remodelling proposals provision will also be made for the existing pumpsets. In view of this the change over from bullock lift to mechanical lift or electrical lift may be accepted.

Pumping water from Cauvery and its channels.—As the total extent of ayacut that would be irrigated by pumping direct from Cauvery during off-season is only about 1,110 acres these pumpsets can be regularised and permitted to pump during off-season also.

As regards the pumpsets that are installed on the banks of Cauvery channels, viz., Raja, Komarapalayam, Mohanur channels and also Tiruchirappalli channels the regularisation of pumpsets upto 2nd October 1961 may be accepted because these pumpsets have been installed by the ryots after seeing that there is good flow available. But provision of sluices with locking

arrangements at the cost of the ryots (as full contribution work) should be insisted upon. During scarcity period when there are turns in the channel the ryots under the pumpsets should also be subject to rationing, as the others.

As regards the specific remarks called for on several points forwarded in Government D.O. No. 3365-N/61, dated August 1962 are furnished below in seriatum.

Items (i), (ii), (iv) and (v).—The Board's suggestion on these items are acceptable.

Item (iii).—This should be done now itself as otherwise there will be a tendency to increase the horse-power of the pumpsets and extend the area under irrigation.

Item (vi).—It is already stated in paragraph 2 of item 6 of G.O. No. 3365, dated 16th October 1957 that these pumpsets cannot be regularised. The same will apply now also.

Item (vii).—The views of the Board in sub-paragraphs (a) to (c) are acceptable.

As regards sub-paragraph (d), it is not clear whether the intention is that the Public Works Department need not be consulted before regularising pumpsets by the Collector. But from the perusal of G.O. No. 1536, dated 13th June 1961, it may be seen that in certain cases, sluices with locking arrangements have to be provided by Public Works Department as a full contribution work or by ryots under the supervision of Public Works Department; then an intimation of such cases to Public Works Department will be necessary for further action. If this is done, no consultation with Public Works Department prior to Collector's regularisation, seems necessary.

In this connection, it is submitted that a register showing the location of pumpsets, name of water-courses, name of owner, horse-power of pumpset, extent irrigated, special conditions of pumping, etc., is made available to the Board of Revenue, Chief Engineer for Irrigation and the several other connected Public Works Department Officers.

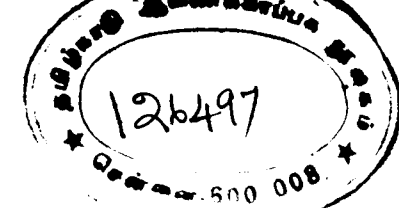
G.O. Ms. No. 3339, Public Works, dated 12th December 1962.

[SUBJECT.—Irrigation—Salem, Coimbatore and Tiruchirappalli districts—Regularisation of unauthorised pumpsets installed on banks of rivers and channel—Conversion of bullock lifts into mechanical lifts—Orders passed.]

Read—the following papers:—

G.O. Ms. No. 3300, Public Works, dated 27th August 1955.

G.O. Ms. No. 3727, Public Works, dated 1st September 1955.



G.O. Ms. No. 3365, Public Works, dated 16th October 1957.

G.O. Ms. No. 1536, Public Works, dated 13th June 1961.

Letter from the Collector of Coimbatore, dated 24th September 1961, No. 6512/61-A-2.

Letter from the Collector of Salem, dated 24th September 1961, No. Roc. A6, 81/694/61.

Letter from the District Revenue Officer, Thanjavur, dated 24th September 1961, No. Rc. 1016/61-A-8.

From the Board of Revenue, B.P. Rt. No. 6828 (H), dated 23rd November 1961.

From the Board of Revenue, B.P. Ms. No. 958 (H), dated 8th June 1962.

From the Board of Revenue, No. H1. 6510/62-1, dated 18th August 1962.

Letter from the Chief Engineer (Irrigation), dated 12th October 1962, No. 4696/61-C-24.

ORDER.

In 1955, the Government examined the question relating to pumping water for irrigation from the rivers in the Cauvery basin in a comprehensive manner with a view to evolving a common policy, so that there might be no reasonable ground for cries of discrimination from any quarter, and, in G.O. Ms. No. 3300, Public Works, dated 27th August 1955, issued general instructions imposing certain restrictions in the matter. Further instructions were issued in G.O. Ms. No. 3727, Public Works, dated 1st September 1956 regarding change over from bullock lift to mechanical lift, and in G.O. Ms. No. 3365, Public Works, dated 16th October 1957 and G.O. Ms. No. 1536, Public Works, dated 13th June 1961, regarding the authorities who could issue permits for the installation of pumpsets, the procedure to be followed in the matter and the criteria and conditions to be adopted for recommending any case of pumping.

2. In June 1961, representations from the ryots under Raja, Komarapalayam, Poyyeri and Mohanur channels in Salem district and from the ryots under the Cauvery in Tiruchengode taluk of Salem district were received by the Government for the grant of permits for pumping water from the channels and the river and for the waiver of penal water-cess for the pumping without permission so far resorted to by them. In that connection, the question of regularisation of the pumpsets installed on the banks of the rivers and channels in Salem, Coimbatore and Tiruchirappalli districts was considered in a conference with the Collectors (District Revenue Officer in the case of Thanjavur) of the above districts, the Chief Engineer (Irrigation) and the Commissioner for Land Revenue. The Collectors generally suggested

that all the pumpsets installed upto a specified date, say, 2nd October 1961, except those within four miles of the tail-ends of the channels, to the conditions that availability of water should be certified to by the Executive Engineers concerned and that there should be no increase in the ayacut served by the unauthorised pumpsets. The Government have examined the whole matter further in consultation with the Chief Engineer (Irrigation) and the Board of Revenue.

3. The Government accept the recommendation of the Chief Engineer (Irrigation) and the Board of Revenue that the pumpsets installed without permission upto and inclusive of 2nd October 1961, on the banks of the Cauvery, Bhavani and Amaravathy Rivers and their channels in Salem, Coimbatore and Tiruchirappalli districts be regularised by the respective Collectors, subject to the following modifications in the conditions now in force:—

(i) There should be no waiver of penal cess already levied and now due on irregular irrigation.

(ii) The horse-power of the pumpset and the extent to be covered be fixed as follows:—

	Horse-power.	Size of suction and delivery pipes.
Up to 3 acres	3	2" × 2½"
Up to 3 to 5 acres ..	3	2½" × 2½"
Up to 5 to 10 acres ..	5	3" × 3"
Up to 10 to 15 acres ..	7.5	4" × 3"

(iii) A deterrent penalty of 20 times the normal water-cess should be levied for any irregular irrigation by pumpsets installed after 2nd October 1961.

(iv) Pumping will be allowed during the off-season also.

(v) No unauthorised pumpsets should be regularised within four miles of the tail-ends of the channels including the 37 cases situated within four miles from the tail-ends of the Cauvery channels in Salem district.

(vi) In the case of Cauvery channels in Salem and Tiruchirappalli districts—

(a) Provision of locking arrangements at the mouths of the leading channels at the cost of the ryots (as full contribution work) should be insisted upon.

(b) During scarcity periods when there are turns in the channels, the ryots under the pumpsets should also be subject to rationing of supply, as the others.

4. (i) The Government have also considered the question of regularising the conversion of bullock lifts into mechanical or electrical lifts and direct that such conversion be also regularised by the Collectors subject

to the following conditions, in addition to those stipulated in paragraph 3 above in so far as they are applicable:—

(i) The conversion should have taken place on or before 2nd October 1961.

(ii) The area already permitted for irrigation by bullock lift should not be increased.

(iii) The suction and delivery pipes should be fixed with sizes as indicated in the orders already in force.

(iv) In the case of baling wet lands—

(a) Conversion to oil engine of 5 h.p. or less or electrical pumpset of 5 h.p. or less will be freely allowed with the usual restrictions on suction and delivery pipes.

(b) For the life time of an oil engine of higher than 5 h.p. now installed, a nominal penalty of one extra water-rate should be levied, and when it is replaced due to wear and tear, replacement must be by 5 h.p. oil engine or a 5 h.p. electric pumpset. The suction and delivery pipes should also be stepped down then to the standards now in force as may be applicable to a 5 h.p. pumpset.

(c) No unauthorised conversion to an oil engine or electric pumpset exceeding 5 h.p. should be allowed or permitted after 2nd October 1961.

(ii) The Board of Revenue has reported that there may be still a number of cases of bullock lifts to be converted into mechanical or electric lifts and has recommended that there is no objection to permit the change over to mechanical or electric lift, restricting the area to be irrigated to the extent permitted for bullock lifts, and specifying the horse-power and sizes of the suction and delivery pipes as laid down in the orders now in force. The Government approve the proposal of the Board of Revenue.

5. The Government also approve the proposal of the Chief Engineer (Irrigation) that a register showing the location of pumpsets, names of water-courses, names of owners of the pumpsets, horse-power of the pumpsets, the extent irrigated, special conditions for pumping, and other relevant particulars should be maintained by the Collectors and made available to the Board of Revenue, the Chief Engineer (Irrigation) and the local Public Works Department Officers. Any additions and alterations to, and deletions from the register, should also be intimated to the Board of Revenue, etc., then and there. The Collectors are requested to take necessary action in the matter.

(By order of the Governor)

E. P. ROYAPPA,

Secretary to Government.

To the Collectors of Salem, Tiruchirappalli and Coimbatore Districts (XXX).

Chief Engineer (Irrigation), Madras.

Board of Revenue (Land Revenue).

G.O. Ms. No. 2158, Public Works, dated 21st July 1959.

[SUBJECT.—Irrigation—Salem district—Pumpset installed on the river Cauvery—Regularisation—Orders issued.]

READ—the following papers:—

G.O. Ms. No. 3300, Public Works, dated 27th August 1955.

G.O. Ms. No. 3365, Public Works, dated 16th October 1957.

Government Memorandum No. 2892-N/57-11, dated 28th December 1957.

From Sri T. M. Kalyannan, M.L.A. and others—representation to Chief Minister, dated 17th July 1957.

From the Collector of Salem to Revenue Department, dated 13th September 1957, Roc. No. A4. 35055/57.

From the Collector of Salem, dated 19th November 1957, Roc. No. A4. 23911/57.

From the Chief Engineer (Irrigation), dated 9th May 1958, No. 3092/57-B-11.

From the Board of Revenue, B.P. Ms. No. 1222, dated 7th October 1958.

ORDER.

The Government in consultation with the Collector of Salem, the Chief Engineer (Irrigation) and the Board of Revenue have examined the request of Sri T. M. Kalyannan, M.L.A. and others for the grant of permits for the existing pumpsets for taking water directly from the Cauvery river in the Salem district and direct as follows:—

(1) The penalty levied from fasli 1364 onwards in respect of the extent cultivated with food crops by pumping Cauvery water in the lands not forming part of Mettur canal ayacut is cancelled and only normal water-cess is to be collected and in the case of pumpsets in the Mettur canal ayacut penalty levied is cancelled in respect of all crops.

(2) Penalty levied in respect of non-food crops should stand in the case of irrigation of the areas not forming part of Mettur Canals ayacut.

(3) All the pumpsets that existed on 27th August 1955 (date of issue of G.O. No. 3300, dated 27th August 1955), are followed to remain and take water subject to the following special conditions in addition to the usual conditions:—

(a) Water should not be taken during the off-season (i.e., 29th January to 8th June, or the actual date of closure and opening of the Mettur Reservoir);

(b) the existing area of irrigation under each pumpset should not be increased;

(c) only food crops should be raised under the ayacut of each pumpset; and

(d) details regarding the horse-power, size of pipes, etc., should be worked out at the time of issuing permits and what are actually required with reference to individual requirements and local conditions should be adopted in consultation with Public Works Department.

(4) The extension of irrigation by lift from Cauvery is allowed in the entire belt on the left bank of the river from Pallipalayam to Jedarpalayam during the crop period under the Cauvery delta.

(By order of the Governor)

P. T. SREEKUMARA PANIKER,
Secretary to Government in-charge.

To the Chief Engineer (Irrigation).

G. O. Ms. No. 777, Revenue, dated 19th February 1962.

[SUBJECT.—Irrigation—Tirunelveli—Manimuthar Project—Including the Tambaraparani system—Sinking of new wells and deepening of existing wells beyond two furlongs away on either side from the main canal and one furlong from the distributaries—Orders issued—Regarding.]

READ—the following papers:—

Government Memorandum No. 39365 H2/60-1, Revenue, dated 25th April 1960.

From the Collector of Tirunelveli, Reference No. A3/30890/58, dated 23rd April 1961.

Letter from the Chief Engineer (Irrigation), Madras, dated 30th June 1961, No. 1617/61-H-2.

From the Board of Revenue, dated 11th September 1961, B.P. Rt. No. 5644/62.

ORDER.

The Government agree with the Board of Revenue and the Chief Engineer (Irrigation) and direct that permission be granted to the ryots under the Manimuthar Project including the Tambaraparani to sink new wells and to deepen the existing wells subject to the conditions that the wells should be two furlongs away on either side from the main canal and one furlong away from the distributaries of the Manimuthar Project including the Tambaraparani system. The Collector of Tirunelveli is requested to publish a notification to this effect.

2. The Government also accept the recommendation of the Board of Revenue and direct that applications

for the sinking of new wells and the deepening of existing wells in the Manimuthar Project including the Tambaraparani system area should be disposed of by the Collector of Tirunelveli on the merits of each case and in consultation with the local Public Works Department authorities subject to the conditions referred to in paragraph 1 above.

(By order of the Governor)

A. J. JEYRAJ,
Deputy Secretary to Government.

To the Board of Revenue (Land Revenue).

„ Chief Engineer (Irrigation), Madras.

G. O. Ms. No. 2030, Public Works, dated 7th July 1959.

[SUBJECT.—Irrigation—Lower Bhavani Project—Installation of pumpsets in wells in the Bhavani, Erode, Dharapuram and Gobichettipalayam taluks of Coimbatore district and Karur taluk of Tiruchirappalli district—Orders passed.]

READ—the following papers:—

Letter from the Chief Engineer (Irrigation), dated 30th December 1958, No. 6567/57-A-20.

Letter from the Madras State Electric Power Consumer Agriculturists' Association, Salem, dated 28th January 1959, No. C/IRR./Elec./2.

G.O. Ms. No. 413, Revenue, dated 11th February 1959.

Letter from the Chief Engineer (Irrigation), dated 28th March 1959, No. 4510/57-N-25.

Letter from the Chief Engineer (Irrigation), dated 5th May 1959, No. 4510/57-N-30.

Letter from the Chief Engineer (Irrigation), dated 24th June 1959, No. 6567/57-A-21.

ORDER.

In paragraph 2 (iv) of Government Order cited, the Government have accorded permission to sink new wells in the Bhavani, Dharapuram and Erode taluks of the Coimbatore district and Karur taluk of the Tiruchirappalli district subject to the condition that the wells should be 2 furlongs away on either side from the main canals and 1 furlong from the distributaries. In his letter first and fourth cited, Chief Engineer (Irrigation) has recommended the installation of pumpsets for unlimited pumping in all the wells in the above taluk as also Gobichettipalayam taluk. The Government accepted the recommendation of the Chief Engineer (Irrigation) and permit installation of pumpsets for unlimited pumping in all wells inclusive of pumping during non-irrigation season in the Bhavani, Erode,

Dharapuram and Gobichettipalayam taluks of Coimbatore district and Karur taluk of Tiruchirappalli district subject to the condition that the wells should be two furlongs away on either side from the main canals and one furlong from the distributaries of the Lower Bhavani Project.

2. The Madras State Electric Power Consumer Agriculturists' Association is referred to the Chief Engineer (Irrigation) for orders on its petition cited.

(By order of the Governor.)

P. T. SREEKUMARA PANIKER,
Deputy Secretary to Government.

To the Chief Engineer (Electricity).

„ Chief Engineer (Irrigation).

G.O. Ms. No. 2104, Revenue, dated 5th August 1960.

[SUBJECT.—Irrigation—Coimbatore—Amaravathy Reservoir Project—Sinking of new wells and deepening of existing wells—Permission—Orders passed.]

READ—the following papers:—

G.O. Ms. No. 3548, Public Works, dated 7th November 1957.

Letter from the Chief Engineer (Irrigation), dated 27th March 1957, No. 4781/55-N-32.

Letter from the Chief Engineer (Irrigation), dated 8th June 1957, No. 5228/56-N-5.

Government Memorandum No. 75251-H3/57-1, Revenue, dated 18th October 1957.

Letter from the Collector of Coimbatore, dated 11th September 1957, R.C. No. 21856/57-P-7.

From the Board of Revenue, B.P. Mis. No. 1194, dated 11th November 1957.

Government Memorandum No. 75251-H3/57-9, Revenue, dated 30th October 1958.

From the Collector of Coimbatore, Reference No. 49530/58-P-9, dated 10th July 1959.

From the Board of Revenue, Reference No. H1. 9012/58, dated 8th October 1959.

Government Memorandum No. 75251-H3/57-13, Revenue, dated 20th October 1959.

From the Board of Revenue, B.P. Mis. No. 1276, dated 8th October 1959.

Letter from the Chief Engineer (Irrigation), dated 17th February 1960, No. 5223/56-N-59.

ORDER.

The Government have examined the question of prohibition of sinking of new wells in the ayacut and

non-ayacut areas in the Amaravathy Project in consultation with the Collector of Coimbatore, the Board of Revenue and the Chief Engineer (Irrigation). The Government direct that permission to sink wells and deepening of existing wells, be granted to the ryots under the Amaravathy Reservoir Project area, subject to the condition that the wells should be two furlongs away on either side of the Main Canal and one furlong from the distributary of the Project. The Collector of Coimbatore is requested to publish a notification to this effect.

(By order of the Governor.)

K. R. SRINIVASAN,
Deputy Secretary to Government.

To the Chief Engineer (Irrigation), Madras.

„ Board of Revenue (Land Revenue).

G. O. Ms. No. 732, Public Works, dated 8th March 1960.

[SUBJECT.—Irrigation—Mettur Canals Scheme—Restriction on installation of electrical and mechanical pumpsets in wells in ayacut area of Mettur Canals Scheme—Relaxation—Orders issued.]

READ—the following papers:—

G.O. Ps. No. 1401, Public Works, dated 29th March 1957.

Petition from Sri K. L. Ramaswami, M.L.A.; Sri G. G. Gurumurthi, M.L.A.; and Sri P. G. Manickam, M.L.A., dated 26th July 1957.

Letter from the Chief Engineer (Irrigation), dated 17th December 1958, No. 4751/58-B-1.

From the Chief Engineer (Electricity), Endorsement, dated 30th December 1958, No. 419-F/55-49.

Letter from the Chief Engineer (Irrigation), dated 10th June 1959, No. 4751/58-B-3.

Letter from the Chief Engineer (Irrigation), dated 20th July 1957, No. 4751/58-B-4.

From the Board of Revenue, B.P. Mis. No. 9/ , dated 4th January 1960.

ORDER.

The Government accept the recommendations of the Chief Engineer (Irrigation) and Board of Revenue in the letters read above, and permit installation of mechanical and electrical pumpsets in wells in the ayacut area of the Mettur Canals Scheme, for lifting

water for irrigation purposes, subject to the following conditions:—

- (1) The horse-power of each pumpset should not exceed 5; and
- (2) No well situated within two furlongs of the main canals or within one furlong of the distributaries should be provided with pumpsets.

(By order of the Governor.)

E. P. ROYAPPA,
Secretary to Government.

To the Chief Engineer (Irrigation), Madras.

G.O. Ms. No. 21, Public Works, dated 3rd January 1962.

[SUBJECT.—Irrigation—Tirunelveli and Madurai Districts—Manimuthar and Vaigai Reservoir Project areas—Extension of electric supply for pumpsets—Conditions governing grant of permits—Orders issued.]

Reference—

- Letter from the Chief Engineer (General), dated 7th December 1955, No. 1944/55-H-1.
- Letter from the Chief Engineer (Electricity), dated 17th March 1956, No. 2835-F-55-11.
- From the Board of Revenue, B.P. Rt. No. 6205/56, dated 17th December 1956.
- From the Board of Revenue, B.P. Mis. No. 1340/57, dated 21st October 1957.
- From the Board of Revenue, B.P. Mis. No. 699, dated 5th June 1958.
- Letter from the Madras State Electricity Board, Madras, dated 5th March 1959, No. 4534-13/58-3.
- Government Memorandum No. 2219 (x)-1/55-33, dated 25th September 1959.
- Letter from the Chief Engineer (Irrigation), dated 6th April 1960, No. 1944/55-H-59.
- From the Board of Revenue, B.P. Mis. No. 527, dated 30th April 1960.

ORDER.

At the instance of the Chief Engineer (Irrigation), the Government have examined the question of imposing suitable conditions for the supply of electricity for pumping water for agricultural purposes in the Manimuthar and the Vaigai Reservoir Project areas in Tirunelveli and Madurai districts in consultation with the Board of Revenue (Land Revenue), and the Madras State Electricity Board.

2. The Madras State Electricity Board has made the following suggestions:—

- (1) The number of wells in the ayacut of each project to which electricity may be supplied and the areas in the ayacut the wells within which alone may be supplied with power, be specified.

- (2) Electricity may be permitted to be supplied to wells which are already fitted with oil engine pumpsets.

3. Meanwhile a representation has been made to the Government by Sri M. G. Shankar, M.L.A., urging the necessity for supply of electric power to the wells lying in the prohibited zone of the Manimuthar Project on the ground that the wells are surrounded by hard rocky soil and that the seepage water will be practically nil. The Chief Engineer (Irrigation) was requested to examine the matter in the light of the remarks of the Madras State Electricity Board in paragraph 2 above and the representation cited and to submit a report to the Government through the Board of Revenue.

4. The Chief Engineer (Irrigation) has submitted consolidated revised draft conditions incorporating suggestion No. (2) of the Madras State Electricity Board mentioned in paragraph 2 above for the supply of electric power for pumping water for agricultural purposes in Manimuthar and the Vaigai Reservoir Project areas for approval of the Government through the Board of Revenue. The Board of Revenue has consulted the Collectors of Madurai and Tirunelveli. The Board has agreed with the Collector of Tirunelveli and the Chief Engineer (Irrigation) that it is not necessary or even quite feasible to specify the number of wells to be supplied with electricity, for pumping in the project ayacut as suggested by the Madras State Electricity Board and that each case may be examined on merits as proposed by the Chief Engineer (Irrigation). The Board of Revenue has recommended that the consolidated draft revised conditions submitted by the Chief Engineer (Irrigation) may be approved.

5. The Government agree with the Board of Revenue that it is not necessary to specify the number of wells to be supplied with the electricity as suggested by the Madras State Electricity Board. They accept the recommendation of the Board of Revenue and approve the consolidated draft revised conditions of the Chief Engineer (Irrigation) for the supply of electricity for pumping water for agricultural purposes in Manimuthar and Vaigai Reservoir Project areas. The conditions as approved are appended to this order and they should form part of the usual agreements to be executed between the consumer and the Madras State Electricity Board.

6. The Chief Engineer (Irrigation) has also examined the question of giving electric supply connection to the wells lying in the prohibited zone of Manimuthar Project. He has reported that there are only eleven wells situated

within a belt of 2 furlongs from the Manimuthar Main canal and Distributary No. 11 which are already fitted with oil pumps and for which the owners have applied for electricity and that erection of electric pumpsets in the place of oil pumpsets will not cause any inconvenience and will not affect the interest of the ryots under the canal prejudicially. The Chief Engineer (Irrigation) has suggested that these eleven wells may be given electric supply in relaxation of condition No. 1 for the Manimuthar Project area in the appendix and subject to the condition that the wells should not be permitted to be fitted with electric pumps of capacity of more than 5 h.p. The Board of Revenue has agreed to the Chief Engineer's proposal. The Government approve the Chief Engineer's proposal and direct that suitable agreements be obtained from the owners of the eleven wells by the Madras State Electricity Board.

(By order of the Governor.)

E. P. ROYAPPA,
Secretary to Government.

To the Chief Engineer (Irrigation).

ENCLOSURE.

APPENDIX.

Revised conditions for supply of electricity for pumping water for agricultural purposes in the Manimuthar and Vaigai Project areas.

A. *Manimuthar Project.*—Electricity will be supplied to work pumpsets in wells in Manimuthar Project area throughout the year for lifting water from wells subject to the following conditions:—

- (1) No existing wells or new wells shall be permitted to have electric power pumping if they are situated within two furlongs of the main canal and one furlong of the distributary channels.

This condition may be relaxed by Government in case of existing wells for which supply of electric power has been sanctioned already.

- (2) No wells shall have pumps of more than 5 horse-power capacity.

- (3) The water pumped out from wells given electric connection shall be used for irrigation within the ayacut belonging to the owner of the wells in the project area

and commanded by the well. If the pumped water is taken outside the ayacut area of the project and ayacut area belonging to the owner of the wells specified above, power supply will be cut off.

N.B. :—The ayacut area of the project and the ayacut area of the well need be fixed by the Public Works Department in consultation with the Collector for this purpose.

- (4) Wells situated in areas outside the project ayacut but within 2 furlongs of the periphery of the ayacut will be given electric supply only on condition that no well is situated within 2 furlongs of the Main canal and one furlong of distributary channels of the project and the capacity of the pump is also not more than 5 horse-power.

- (5) Wells in the ayacut area, which are already fitted with oil engine prior to the date of this order, may also be permitted to get electric supply, provided that they are not within 2 furlongs of the Main canal and one furlong of the distributary channels and that other conditions above are satisfied.

2. *Vaigai Project.*—Electricity to work pumps in wells in the irrigated area of the Tirumangalam canal of the Vaigai Project will be supplied under the following conditions:—

- (1) Only a limited number of wells will be given electric supply to work pumps. The ayacut area will be divided into convenient zones surrounded by drains and distributaries and the number and location of wells to be given electric supply will be fixed and approved by the Chief Engineer for Irrigation on the recommendation of the Collector of Madurai. No other well in the irrigation area shall have electric power pumping.

- (2) No well situated within 2 furlongs of the Main canal and one furlong of the distributary channels shall be permitted to have electric power pumping.

- (3) No well shall have pumps of more than 5 h.p. capacity.

- (4) The power supply to wells shall be cut off if water pumped out of these wells is taken to areas outside the ayacut.

- (5) Wells situated in areas outside the project ayacut but within 2 furlongs of the periphery of the ayacut will be given electric supply only on condition that no well is situated within two furlongs of Main canal and one furlong of distributary channels of the project and the capacity of the pump is also not more than 5 horse-power.

- (6) Wells in the ayacut area, which are already fitted with oil engines prior to the date of this order, may also be permitted to get electric supply provided that they are not within two furlongs of the main canal and one furlong of the distributary channels and that other conditions above, are satisfied.

G. O. Ms. No. 2046, Revenue Department, dated the 28th April 1960.

[SUBJECT.—Irrigation—Major (North Arcot) Sathanur Reservoir Project—Excavation of new wells and deepening of existing wells beyond two furlongs away on either side from the Main canal and one furlong of the distributary of the Sathanur Reservoir Project—Permission—Granted.]

READ—the following papers:—

Letter from the Chief Engineer (Irrigation), Madras, No. 6538/59-H-1, dated 1st December 1959.

From the Board of Revenue, B.P. Mis. No. 1568, dated 16th December 1959.

ORDER.

The Government direct that permission to sink new wells and deepening of the existing wells be granted to the ryots under the Sathanur Reservoir Project area subject to the condition that the wells should be two furlongs away on either side from the Main Canal and one furlong of the distributary of the Sathanur Reservoir Project. The Collectors of North Arcot and South Arcot are requested to publish a notification to this effect.

2. The action of the Superintending Engineer in having instructed the Executive Engineer to adopt the same restrictions as were imposed in the case of Lower Bhavani Project areas for Sathanur Reservoir Project areas also, till the orders of the Government on the subject are received, is ratified.

(By order of the Governor.)

K. R. SRINIVASAN,
Deputy Secretary to Government.

To the Board of Revenue (Land Revenue).

- „ Chief Engineer (Irrigation), Madras.
- „ Board of Revenue (Food Production), Madras.
- „ Director of Agriculture, Madras.
- „ Collectors of North Arcot and South Arcot.
- „ Food and Agriculture (F. III) Department.
- „ Public Works Department.

G.O. Ms. No. 2413, Public Works, dated 6th September 1962.

[SUBJECT.—Irrigation—Lower Bhavani Project—Installation of pumpsets for lifting water from wells in the Project ayacut—Orders passed.]

READ—the following papers:—

G.O. Ms. No. 486, Public Works, dated 11th February 1955.

G.O. Ms. No. 2030, Public Works, dated 7th July 1959.

Read also—

Letter from the Chief Engineer (Irrigation), No. 4510/57 N-43, dated 18th November 1960.

From the Board of Revenue, B.P. Mis. No. 1493/60, dated 20th December 1960.

From the Board of Revenue, B.P. Mis. No. 428/61, dated 1st April 1961.

From the Board of Revenue, B.P. L. Dis. No. H. 10914/61, dated 4th March 1962.

ORDER.

In G.O. Ms. No. 486, Public Works, dated 11th February 1955, orders were issued permitting supply of electricity to work pumpsets in the Community Project areas of the Lower Bhavani Project are for lifting water from wells throughout the year, whether on ayacut lands or on non-ayacut lands, subject to the following conditions:—

(i) The horse-power of each pumpset should not exceed five;

(ii) the number of such pumpsets should be restricted to 200 (two hundred);

(iii) the power should be utilised only for irrigation of dry crops and the crops referred in G.O. Ms. No. 3015, Revenue, dated 19th October 1954; and

(iv) supply will be cut off if it is used for purposes other than those for which it has been specifically sanctioned.

Subsequently in G.O. Ms. No. 2030, Public Works, dated 7th July 1959, the Government permitted installation of pumpsets for unlimited pumping in all wells inclusive of pumping during non-irrigation season in Bhavani, Erode, Dharapuram and Gobichettipalayam taluks of Coimbatore district, and in Karur taluk of Tiruchirappalli district, subject to the condition that the wells should be two furlongs away on either side from the Main canals and one furlong from the distributaries of the Lower Bhavani Project.

2. A doubt has been expressed whether the other conditions imposed in G.O. Ms. No. 486, Public Works, dated 11th February 1955, restricting the horse-power of the pumpsets, etc., have become inoperative in as much as they have not been repeated in G.O. Ms. No. 2030, Public Works, dated 7th July 1959.

3. The Government have examined the question in consultation with the Chief Engineer (Irrigation) and the Board of Revenue, and direct that the grants of permission for installing pumpsets for lifting water from the wells in the Lower Bhavani Project area shall be subject to the conditions mentioned below, in addition to the other conditions applicable to the grant of such

permission as stipulated in G.O. Ms. No. 2030, Public Works, dated 7th July 1959:—

(1) The horse-power of each pumpset should not exceed five;

(2) The power should be utilised for the irrigation of crops permitted in the Lower Bhavani Project area by the Government from time to time; and

(3) Supply will be cut off if it is used for purposes other than those for which it has been specially sanctioned.

(By order of the Governor)

Secretary to Government.
E. P. ROYAPPA,

To the Board of Revenue, Madras.

„ Chief Engineer (Irrigation), Madras.

Letter No. Ref. H1. 2772/61-4, Board of Revenue, (Land Revenue), dated 15th January 1962.

[SUBJECT.—Irrigation—Lower Bhavani Project (Coimbatore)—Lifting of ban on sinking of new wells with pumpsets—Report—Submitted.]

Reference—

Letter from the Chief Engineer (Irrigation), Madras, dated 21st March 1961 and 18th July 1961, No. 2847/60-N-3.

Collector, Coimbatore, dated 12th September 1961, Ref. No. 39887/61-A-8.

Submitted to the Government.

2. In the circumstances reported by the Chief Engineer for Irrigation, Madras and the Collector of Coimbatore, the Board recommends that the existing restrictions that no pumpsets should be installed in the Lower Bhavani Project area within two furlongs of the Main canal and one furlong from the distributary may be relaxed as follows:—

(1) The Lower Bhavani Project main canal below mile 74/2 may be treated as a distributary for the purpose of granting permission for the sinking of new wells or for the installation of electric pumpsets.

(2) Each case may be examined on merits and permission granted for subject to the condition that—

(a) only the land included in the ayacut of the Lower Bhavani Project should be irrigated; and

(b) that irrigation should be done during the particular turn in which the lands are included.

3. The further report of the Chief Engineer (Irrigation), Madras, promised in his letter No. 2847/60 N-12, dated 18th July 1961, still awaited.

(Sd.)—

for Secretary.

To the Secretary to Government (Revenue Department).
(Public Works Department).

Copy to the Chief Engineer (Irrigation), Madras.

Collector of Coimbatore.

Letter No. 2847/60, N-32, Chief Engineer's (Irrigation), dated 12th September 1962.

[SUBJECT.—Irrigation—Lower Bhavani Project—Coimbatore—Lifting of ban on sinking of new wells with pumpsets—Resolution of the District Development Council—Report.]

Reference.—My letter No. 2847/60-N-12, dated 18th July 1962.

In continuation of my letter cited, I enclose a statement showing the reaches of the main canals of various projects with which can be treated as distributaries for the purpose of giving permission for sinking new wells and installation of new pumpsets.

I request that the orders of Government may please be obtained on this and communicated to me at an early date.

The tail end reach of the Mettur West Bank canal itself for a length of 6 miles is named as tail end and distributary which is a major distributary in this canal. Hence, any reach above 27/0 need not be classed as distributary for the purpose of giving permission for sinking new wells and installing pumpsets.

(Sd.)—

for Chief Engineer (Irrigation).

To the Secretary to Government, Public Works Department, Madras-9, through the Board of Revenue, Madras-5.

Enclosure.—A Statement.

Copy with a copy of statement to the Secretary to Government, Public Works Department, direct.

STATEMENT SHOWING THE PARTICULARS OF THE MILEAGES OF VARIOUS CANALS BELOW WHICH THE CANAL WILL BE TREATED AS DISTRIBUTARY FOR THE PURPOSE OF GIVING PERMISSION FOR SINKING NEW WELLS AND INSTALLATION OF NEW PUMPSETS.

Serial number and name of the main canal.	Total length of the main canal.	Discharge at the head of the canal.	Mileage and type of masonry work below which canal will be treated as distributary.	Discharge of canal at this point.	Mileage or major distributary taking off in the main canal.	Discharge of the distributary.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 Sathanur Project Main canal.	22/0	400 C/S	17-5/510 1.5 Feet drop	63 C/S	17/0	97 C/S
2 Tirumangalam canal (Vaigai Project).	17/6	208 C/S	15/1-328 Regulator	64 C/S	VI Branch	64 C/S
3 Amaravathy Main canal ..	39/1-600	301 C/S	36/2/340 Super passage	Not given	35/7/478	21 C/S
4 Krishnagiri Project Left canal.	11/3-70	100 C/S	9/1 New reach begins	16 C/S	3/7	28 C/S
5 * Krishnagiri Project Right side canal.	8/6-110	100 C/S	7-2 New reach begins	24 C/S	6/7	23 C/S
6 * Manimuthar Main canal ..	28/5-30	445 C/S	27/0-524 Regulator	115 C/S	27/0-524	110 C/S
7 * Mettur East Bank canal.	40	600 C/S	34/5-615 Bridge	91 C/S	14/6-90	82 C/S

* In these cases, the through di charge at the point below which it is proposed to be considered as distributary is slightly higher than the discharge of the major distributary. These reaches may be treated as distributary as the difference is negligible.

Endorsement No. 2834/59, BEP. Chief Engineer's (Irrigation), dated 16th February 1960.

READ—the following papers:—

Letter Roc. No. 56182/59 (A.4), dated 8th February 1960, from the Collector, Salem, to the Chief Engineer for Irrigation, Madras-5.

[SUBJECT.—Irrigation—Major Krishnagiri Reservoir Project—Digging of new wells and deepening the existing wells banned—Regarding.]

Reference.—Superintending Engineer's (Coimbatore Circle) letter No. 2834/59 B-4, dated 22nd January 1960.

With reference to the instructions issued in Government Memorandum No. 80382/H3/59-3, dated 17th November 1959, a notification in Tamil, regarding prohibition of excavation of new wells and deepening the existing wells in the Krishnagiri Reservoir Project has been published in the extraordinary issue of the Salem District Gazette,

dated 29th December 1959. A published copy of the notification is enclosed. I have also instructed the Tahsildar and Estate Manager, Krishnagiri, to publish the contents of the notification in the concerned villages in the Krishnagiri Reservoir Project area by beat of tom-tom and by affixing copies of the notification in conspicuous places.

(Sd.) _____,
for Collector, Salem.

Enclosure.—Published copy of notification.

Copy forwarded to the Superintending Engineer, Coimbatore Circle, in continuation of this office letter No. 2843/59-B-1, dated 8th August 1959.

(Sd.) K. V. EKAMBARAM,
Chief Engineer (Irrigation).

To the Superintending Engineer, Coimbatore Circle.

Enclosure.—One copy of notification.

G.O. Ms. No. 847, Public Works, dated 24th March 1962.

[SUBJECT.—Irrigation—Madurai District—Periyar Main Canal—Grant of permits to install electric pumpsets—Proposal of the Chief Engineer (Irrigation)—Approved.]

READ—the following papers:—

From Srimathi A. S. Ponnammal, M.L.A., dated 26th March 1960.

From the Chief Engineer (Irrigation), No. 1944/55-H-73, dated 16th June 1960.

From the Board of Revenue, L. Dis. No. N-1-3233/40, dated 15th September 1960.

ORDER.

Representation has been received by the Government for the grant of permits to the ryots to install electric pumpsets in the wells situated near the Periyar Main Canal.

2. The Government have examined the matter in consultation with the Chief Engineer (Irrigation) and the Board of Revenue and approve the proposal of the Chief Engineer (Irrigation) to grant permission to the ryots to install electric pumpsets in the wells situated near the Periyar Main Canal and its distributaries subject to the following conditions:—

(1) No wells situated within two furlongs of the Main Canal and one furlong of the distributary channels shall be permitted to have electric power pumping.

(2) No well shall have pumps of more than 5 horse-power capacity.

(3) The power supply to wells shall be cut off if water pumped out of these wells is taken to areas outside the ayacut.

(4) Wells situated in areas outside the project ayacut, but within a furlong of the periphery of the ayacut will be given electric supply, only on condition that no well is situated within two furlongs of the main canals and one furlong of distributary channels of the project and the capacity of the pump is also not more than 5 horse-power.

(5) Wells in the ayacut area, which are already fitted with oil engines prior to the date of this order may also be permitted to get electric supply, provided that they are not within two furlongs of the main canal and one furlong from the distributary channels and that other conditions above are satisfied.

(By order of the Governor)

M. SARGUNAM,
Deputy Secretary to Government.

To the Chief Engineer (Irrigation), Madras.

„ Collector of Madurai.

„ Board of Revenue.

Memorandum No. 793 N2/59-27, Public Works, dated 29th November 1961.

[SUBJECT.—Irrigation—Extension of power supply for lift irrigation in and around project areas—Further remarks—Called for.]

Reference.—Letter from the Chief Engineer (Irrigation), No. 7438/58-A-7, dated 29th April 1961.

The Chief Engineer (Irrigation) is informed that it is proposed to impose the following five conditions for the supply of electric energy to pumpsets installed in the ayacut of irrigation projects:—

(1) Wells situated within two furlongs from the main canal and one furlong from the distributaries will be given electric supply for pumping only subject to the specific condition that no pumping will be allowed during the irrigation season.

(2) No well will be allowed to have pumps of more than 5 horse-power capacity.

[Conditions (1) and (2) will also apply to wells in areas outside the project ayacut but within two furlongs of the periphery of the ayacut.]

(3) Pumps situated in the ayacut area and given electric supply will be allowed to pump supply only to areas within the ayacut and not outside it.

(4) The nature of crops raised should be the same as those permitted for the project ayacut.

(5) Conversion of oil engine pumps into electric-driven pumps will also be governed by the above conditions.”

2. The Chief Engineer (Irrigation) is requested to offer his further remarks, if any, on the above conditions. His report should reach Government within a fortnight from the date of receipt of this Memorandum.

(By order of the Governor)

E. P. ROYAPPA,
Secretary to Government.

To the Chief Engineer (Irrigation), Madras-5.

G.O. Ms. No. 3985, Public Works, dated 6th October 1948.

[SUBJECT.—Irrigation—Palar Basin—Extension of irrigation—Reclamation of Palar Basin Rules temporarily—Orders.]

READ—the following papers:—

G.O. No. 1617-I, dated 19th June 1931.

G.O. No. 1557, Revenue, dated 2nd July 1947.

From the Chief Engineer (Irrigation), No. 3184/46-B-27, dated 15th January 1948.

From the Board of Revenue, Rout. No. 4740, dated 19th July 1948.

ORDER.

In G.O. No. 1617-I, dated 19th June 1931, the Government directed that no new irrigation work should be constructed in the Palar Basin and that no extension of existing works should be undertaken with the object of increasing the amount of water impounded or drawn off by them. In connection with the Grow More Food Campaign, the Government examined in consultation with the Chief Engineer (Irrigation) and the Board of Revenue, the question of relaxation of these orders. As the Palar is already overburdened with irrigation, no general relaxation was considered possible and the following two suggestions were examined:—

(i) Whether there is any objection to put in new wells or tube-wells for irrigation of dry lands in the basin; and

(ii) whether extension of irrigation to dry lands for an irrigated crop after a favourable North-East Monsoon could be permitted.

2. As regards suggestion (i), the Chief Engineer (Irrigation) suggested that new wells might be allowed under a system of permits to be granted by the Collector in consultation with the Executive Engineer and that as it is necessary to restrict the number of new sources thus permitted in an area, the number of wells permitted every year and the area allowed to be irrigated might be reported to him for watching the position. The Board of Revenue pointed out that the restrictions on the grant of loans for the construction of new wells in the Palar Basin which has been imposed in pursuance of the orders of 1931, referred to were subsequently relaxed in G.O. Ms. No. 2549, Revenue, dated 30th September 1939, wherein it was also ordered that the Public Works Department should be consulted before a loan was granted for the sinking of wells on private land or before a well was sunk on land at the disposal of the Government which orders were later on modified to the effect that reference to the Public Works Department was necessary only in the case of sinking of wells in the lands on margin of rivers, vankas, supply channels, or in tank-beds in private lands. The Board has, therefore, expressed the view that no further orders are necessary. The Government agree with the views of the Board of Revenue. They, however, direct that the Collector of the District concerned should report the number of wells permitted to be sunk and the area permitted to be irrigated each year to the Chief Engineer (Irrigation) at the close of the years so that he may examine whether any further sinking of wells should be restricted or not.

3. In respect of suggestion (ii) the Chief Engineer (Irrigation) states that there would be no objection to the irrigation of new dry lands for an irrigated crop between January and May or just outside the periphery of the ayacut if the storage in tanks or supplies in channels are favourable after a good North-East Monsoon. He suggested that in favourable North-East Monsoon year or years of floods in Palar, the Collector may notify in consultation with the Executive Engineer before 1st January (after the experience of the preceding North-East Monsoon) if dry lands may be irrigated. He adds that such lands should not be irrigated in other years or during the period from June to December following the notification and that any unauthorised irrigation should be subjected to heavy penalties. He, however, suggests that this relaxation of the rules should only be temporary and that its effects should be watched for some time. The Board of Revenue agrees with the Chief Engineer (Irrigation). The Government accept the recommendation of the Chief Engineer (Irrigation) and direct that the restriction on the extension of irrigation in Palar Basin be relaxed to this extent temporarily for a period of five years.

The Chief Engineer (Irrigation) is requested to review the position after the period of five years and submit a report to the Government through the Board of Revenue so as to enable them to decide whether the relaxation may be made permanent or cancelled.

(By order of the Governor)

T. A. VARGHESE,
Secretary to Government.

To the Chief Engineer (Irrigation).

G.O. Ms. No. 1198, Public Works, dated 6th May 1961.

[SUBJECT.—Irrigation—Palar Basin—Extension of irrigation—Relaxation of Palar Basin Rules—Orders—Issued.]

READ—the following papers:—

G.O. Ms. No. 3985, Public Works, dated 6th October 1948.

G.O. Ms. No. 3024, Public Works, dated 22nd October 1959.

G.O. Ms. No. 2614, Public Works, dated 16th September 1960.

Letter from the Collector of North Arcot, Vellore, No. H5/Pd. 1065/60, dated 19th August 1960.

Letter from the Chief Engineer (Irrigation), No. 4302/58-H-8, dated 10th January 1961.

From the Board of Revenue, B.P. Mis. No. 378, dated 27th March 1961.

ORDER.

The Government accept the following proposals of the Chief Engineer (Irrigation) and recommended by the Board of Revenue in regard to the relaxation of Palar Basin Rules ordered in the Government Order cited:—

(i) New wells may be permitted for irrigating the lands in the Palar Basin, provided such wells are 2 furlongs away from the spring heads of channels and 1 furlong away from the spring channel and provided crops grown correspond to the classification of the land registered as single-crop wet, double-crop wet, dry, etc.

(ii) Horse power of each pumpset should not exceed five.

2. Permission to sink such wells or installing pumpsets should be given by the Collector in consultation with the Executive Engineer who will examine each case and decide on its own merits, taking into account the area benefited under each well, location of the adjacent wells, the nature of the strata intervening between wells, etc.

3. The Government direct that the above relaxation be in force for a period of five years. The Collectors of Chingleput and North Arcot are requested to send annual returns regarding the number of new wells sunk to the Chief Engineer (Irrigation), so as to enable him to watch the position and have it reviewed towards the end of the period.

4. The Chief Engineer (Irrigation) is requested to send a report to Government through the Board of Revenue towards the end of the period on the need for further continuance or otherwise of the relaxation.

(By order of the Governor)

E. P. ROYAPPA,
Secretary to Government.

To the Chief Engineer (Irrigation), Madras.

„ Board of Revenue, Madras.
„ Collector of North Arcot, Vellore.

Chief Engineer's (Irrigation) letter No. 5731/56 N-87, dated 27th June 1962, to the Secretary to Government, Public Works Department [through Board of Revenue, (Land Revenue)].

[SUBJECT.—Irrigation—Amaravathi Reservoir Project—Coimbatore District—Unrestricted use of electricity for pumping water in the ayacut area—Proposals—Regarding.]

Reference—

(i) G.O. Ms. No. 1793, Revenue, dated 25th April 1961.

(ii) Government Public Works Department Memorandum No. 609-S/62-1, dated 9th February 1962.

(iii) Board's letter No. H1, 2755/62-1, dated 2nd June 1962.

With reference to Government's reply to resolution 7 (c) passed by the Amaravathi Reservoir Project Ryots' Association at its annual meeting held on 6th March 1960, as contained in paragraph 2 of G.O. Ms. No. 1793, Revenue Department, dated 25th April 1961, I have to state as follows:—

In Revenue Department G.O. Ms. No. 3104, dated 5th August 1960, permission has been accorded to sink new wells and deepening of existing wells under the Amaravathi Reservoir Project area subject to the condition that the wells should be 2 furlongs away on either side of the main canal and 1 furlong from the distributary of the project. Hence, it is recommended that installation of pumpsets for unlimited pumping from all the wells inclusive of pumping during non-irrigation season, may be permitted under the Amaravathi project, subject to the condition that the wells should be 2 furlongs away from the main canal and 1 furlong from the distributaries, as permitted in the Lower Phavani Project ayacut area in G.O. Ms. No. 2030, Public Works, dated 7th July 1959.

As regards sugarcane area, Government have already permitted ryots to construct wells and use pumpsets only in the areas which are localised for sugarcane cultivation in Government Revenue Department Memorandum No. 9936-N3/58-3, dated 3rd September 1959. In this localised area for sugarcane, the distance specified from main canal and distributary for wells, will not apply as the sugarcane crop requires water for ten months in the year, whereas water can be allowed in the canal for six months only from 1st August to 31st January—the period of irrigation. For the balance period, the sugarcane crops are to be watered and supplemented by pumping from the wells. Such pumping without limitations in the distances, should be restricted only for sugarcane crop and not for raising any other crop.

The additional condition to be stipulated is that the horse-power of the pump should not exceed five as recommended in my letters to Government No. 4510/57 N-43, dated 18th November 1960, and No. 862/60 N-4, dated 20th July 1960.

(Signed) _____,

for Chief Engineer (Irrigation).

Copy to the Superintending Engineer, Coimbatore Circle, for information (with reference to his No. 1370-I, dated 28th May 1963).

G.O. Ms. No. 3123, Public Works, dated 21st November 1962.

[SUBJECT.—Electricity—Co-ordination of rural electrification and development—Report of *Ad hoc* Committee—Orders passed.]

READ—the following papers:—

G.O. Ms. No. 3566, Public Works, dated 18th December 1959.

Letter from the Chairman, *Ad-hoc* Committee on Rural Electrification, dated 31st August 1960, No. 35-I/60.

Letter from the Chief Engineer (Irrigation), dated the 9th January 1961, No. 10188/60 A-1.

Letter from the Chief Electrical Inspector to Government, dated 7th February 1961, No. C-697 R & C/60-2.

Letter from the Madras State Electricity Board, dated the 12th April 1962, No. 5956-B2/60-9.

Letter from the Madras State Khadi and Village Industries Board, dated 21st July 1961, No. 1585/D2/61-3.

ORDER.

With a view to ensure the best possible use of electricity in rural areas on a planned basis, the Government in their Order Ms. No. 3566, Public Works, dated the 18th December 1959, constituted an *Ad hoc* Committee to organize and direct a survey to secure the following information:—

(i) The existing pattern of distribution of electric power in different districts and different parts of districts.

(ii) The existing pattern of agricultural, industrial and household uses of electric power in different districts and different parts of districts.

(iii) The servicing facilities and credit facilities to be provided and the difficulties, if any, to be removed in order to ensure—

(a) the optimum productive use of power;

(b) the encouragement of the growth of small-scale and cottage industries; and

(c) the extension of the use of power by the poorer classes of villagers.

The following were appointed as members of the Committee:—

Chairman.

(i) Development Commissioner.

Members.

(ii) Ex-Officio Secretary to Government, Finance (Planning) Department.

(iii) Director of Industries and Commerce.

(iv) Director of Agriculture.

(v) Registrar of Co-operative Societies.

2. The Committee submitted its report in August 1960 and made the following recommendations:—

“(I) The Committee observes that the progress of use of electricity for agricultural pumping (which constitutes the bulk of the rural load) has been very rapid during the last decade. Progress of rural electrification during the last ten years has been quite satisfactory.

(II) The Committee observes that the progress of electrification of villages in the area covered by licensees is poor.

The acquisition of all the licensees' areas, under the control of the Electricity Board would, no doubt, solve the problem but it would involve heavy capital outlay. If provision is made for such outlay in the Third Five-Year Plan, the provision for electrifying new areas will get correspondingly reduced. The Committee considers that the latter must have priority during the Third Plan. The Committee accordingly recommends that the Government should take up this matter in discussion with licensees, induce them to participate in planned extension of village electrification in licensees' areas during the Third Plan period and assist them by advancing adequate loans to them through the State Electricity Board every year. The aim should be to secure that electrification in licensees' areas is accelerated to catch up with other areas under the control of the Electricity Board, on the basis of a common plan for the State as a whole.

(III) The Committee recommends that the rural electrification during the Third Five-Year Plan should be carried out according to a planned and phased programme under a Block Electrification Scheme. The potential of agricultural pump-load in each Block should be ascertained, target pumpsets fixed for each Block, batches of blocks to be totally electrified in each year of the Third Plan settled, and rural electrification carried out according to this programme.

The Committee also recommends that the special financial guarantee required from agricultural consumers may be abolished upon the implementation of the Block Electrification Scheme. If the Electricity Board sustains losses on account of the above scheme, that situation could be dealt with by Government when it arose.

(IV) The Committee recommends appointment of Extension Officers for Electricity in the Block where such posts are required to collect necessary data and assist the Block and the State Electricity Board to work out and implement the Block Electrification Scheme and help in attaining the pump-set target as quickly as possible.

(V) To afford cheap and quick servicing and repair facilities to the ryots, the Committee recommends appointment of a trained mechanic for every group of 60 to 100 pumpsets under the control of the Extension Officer, Industries in the three selected Blocks of Kalasapakkam, Chetpet and Pernamallur in North Arcot District. A compounding fee of Rs. 10 per pumpset per annum is suggested. If the arrangement proposed in the above three Blocks is found successful after a trial for one year, it may be extended to other Blocks where the ryots require the facilities. The Committee also recommends provision of facilities for major repairs to motors and pumps to be made in the proposed village workshops of the Industries Department.

(VI) The Committee recommends that the present system of varying period of repayment according to the amount of hire purchased loans for purchase of pumpsets may be modified and an uniform period of six years may be fixed for payment. This will reduce the instalment amounts for smaller loans and help the poorer ryots with small holdings.

(VII) When the Block Electrification Scheme is implemented it is suggested that all loans now given by the various Departments to ryots for purchase of pumpsets, etc., may be advanced through the Block Development Officer under the direction of the Revenue Divisional Officer.

(VIII) The Committee recommends the abolition of imposition of special guarantee on public utility services such as pumpsets for rural water-supply, sirens, etc.

(IX) The Committee is of opinion that until the power supply exceeds demand the existing restrictions on staggering supplies to agricultural pumpsets are necessary in the larger interests of the State. The Committee suggests that the position must be explained by Government to Panchayat Unions concerned and by the latter to Panchayats, so that inevitable inconvenience may be willingly accepted. The suggestions, if any, which may be made by Panchayats for modification of the scheme of staggering may be considered and complied with, so that inconvenience may be mitigated wherever possible.

(X) There are clear signs that Madras State, having practically exhausted the sources of surface supply for irrigation purposes is beginning to exhaust the underground supply as well. Competitive pumping of limited supplies of underground water is resulting in rapid fall of water table in some areas. The committee suggests that such areas should be identified and ceiling of pumping load should be imposed in the Block concerned after consulting the Panchayat Unions concerned. In addition, it is suggested that the flow in the streams in villages may be utilised and ponds formed in suitable locations to improve the water condition in the wells.

(XI) The ban on pumping from wells near irrigation canals may be necessary only in cases where the lower ayacut will be adversely affected. This need not always be the case. The Committee recommends that each case of installation of electric pumpsets in wells near irrigation canals and distributaries should be reviewed carefully and restrictions enforced or relaxed, as required, in the interest of overall productivity.

(XII) For better productive use of power for agriculture, the Committee recommends the following:—

(a) development of river pumping schemes, wherever feasible; and

(b) sinking of wells in Kannais and pumping to the ayacut to improve irrigation.

(XIII) The Committee is of opinion that some manual industries in the villages like handloom industry which are adaptable to mechanisation should be mechanised gradually and electricity usefully employed to work them and increase production. In view, however, of previous controversies on this subject, this Committee refrains from making specific recommendations for immediate action.

(XIV) The Committee considers that the general purposes Engineering Workshops, Workshops, and Industrial Estates programmed to be set up by the Industries Department during the Third Plan will popularise the use of power operated machines in rural areas and encourage gradual dispersal of small-scale industries in the villages.”

3. The Government have examined the recommendation in consultation with the Madras State Electricity Board and the concerned Heads of Departments, and they pass the following orders:—

Recommendation I—Rural Electrification in Licensees' area of supply.

The Government are already paying special attention to the rural electrification in licensees' areas by granting loans to the licensees for taking up such schemes. The Madras State Electricity Board also is taking up the electrification of the under-developed areas which lie within the jurisdiction of the licensees with the consent of the licensees. In this connection, the Chief Electrical Inspector to Government has made the following suggestions:—

(i) that the licensees may be allowed a additional maximum demand of power to achieve a planned development in their areas; and

(ii) that the licensees be induced to restrict to 10 per cent of the return in the case of agricultural extensions and to impose this as a condition for the grant of loan.

The Government accept these suggestions and recommend to the Electricity Board that additional maximum demand of power may be allowed to the licensees to achieve a planned development in their areas. The Government agree with the Chief Electrical Inspector to Government that the licensees should be induced to restrict the return to 10 per cent in the case of agricultural extensions and that this should be imposed as a condition for the grant of loans in future. The Chief Electrical Inspector to Government is requested to issue necessary instructions to the licensees in this regard.

Recommendation II—Pattern of rural electrification during Third Five-Year Plan.

The Electricity Board has suggested that this suggestion of the *Ad-hoc* Committee may be tried as an experimental measure in a few Blocks, to start with. The Government accept that the recommendation of the *Ad-hoc* Committee may be tried as an experimental measure in the following Blocks:—

Kalasapakkam, Chetput and Pernamallur Blocks in North Arcot District or any adjoining Blocks served by the Madras State Electricity Board.

The Madras State Electricity Board is requested to evolve suitable schemes for implementing the suggestion in the selected Blocks.

Recommendation III—Abolition of special guarantee (continued).

The Madras State Electricity Board has suggested that this may be considered after the study of the working of the Block Electrification Scheme in selected Blocks. The Government agree with this suggestion of the Madras State Electricity Board in view of the fact that they have already reduced the special minimum guarantee to Rs. 35 per annum in all areas in the State and are considering the general reduction of the special minimum guarantee with a view to abolish it altogether.

Recommendation IV—Appointment of Extension Officers for Electricity.

This recommendation is being examined by Government in Rural Development and Local Administration Department and orders thereon will be issued separately.

Recommendation V—Appointment of mechanics for servicing repair facilities to agriculturists.

The Government accept this recommendation. Further orders in the matter will be issued by Government in the Food and Agriculture Department in consultation with the Industries, Labour and Co-operation Department.

Recommendation VI—Varying the period of repayment of loans.

The Government do not consider it necessary to change the present system of recovering the loans in a period of three to seven years depending upon the loan amounts sanctioned.

Recommendation VII—Advancing loans through Block Development Officers.

The rule of the Block Development Officer has changed with the implementation of the Madras Panchayats Act, 1958. He is now the Commissioner of the Panchayat Union Council also which entails additional responsibilities on him. If he is made the agency for the disbursement of the loans for pumpsets, etc., sanctioned by the various Departments, the Block Development Officer will be overburdened with greater responsibilities and will not be able to cope with it. The Government, therefore, direct that the existing practice in regard to the grant of loans be continued.

Recommendation VIII—Abolition of special guarantee for rural water-supply, sirens, etc.

As the Madras State Electricity Board has agreed to the above recommendation, the Government accept the recommendation and recommend that suitable orders abolishing the levy of special guarantee on public utility services, such as for rural water-supply, sirens, etc., may be issued by the Madras State Electricity Board in the matter.

Recommendation IX—Restriction on power supply.

The Government accept the recommendation and direct that the Chief Electrical Inspector to Government should implement the recommendation in all cases of restriction and control of power supply.

Recommendation X—Competitive pumping of limited supplies of underground water.

The Government consider that as the proposed Block Electrification Scheme is to be experimented only in three selected Blocks the recommendation may be taken up for consideration when it is decided to electrify the rural areas block-wise as recommended by the committee.

Recommendation XI—Ban on pumping from wells near irrigation canal.

The Government agree with the recommendations of the Chief Engineer (Irrigation) and the Board of Revenue that no relaxation of the restrictions in force is necessary with the proviso that pumping from wells within the

prohibited distances will be allowed during the off season.

Recommendation XII—Development of river pumping schemes and sinking of wells.

River pumping schemes are sanctioned by Government in Food and Agriculture Department, wherever feasible. The Government have examined already the other recommendation for sinking of wells in Kanmois and have dropped the same.

4. The Government consider that no orders are necessary in regard to other recommendations which are of the nature of a general observation by the *Ad-hoc* Committee.

(By order of the Governor)

E. P. ROYAPPA,
Secretary to Government.

To the Chairman, Madras State Electricity Board, 157, Mount Road, Madras-2.
„ the Chief Electrical Inspector to Government, 157, Mount Road, Madras-2.
„ the Chief Engineer, Madras State Electricity Board, 157, Mount Road, Madras-2.
„ the Rural Development and Local Administration (P2) Department.
„ the Food and Agriculture Department (with extract).
Copy to the Board of Revenue, Chepauk, Madras-5.
„ the Secretary, Madras State Khadi and Village Industries Board, Fort St. George, Madras-9.
„ the Chief Engineer (Irrigation), Madras 5.
„ the Secretary, Planning Commission, Government of India, New Delhi.

G.O. Ms. No. 1597, Public Works, dated 9th April 1953.

[SUBJECT.—Irrigation—Palar Basin—Extension of irrigation—Relaxation of Palar Basin Rules—Continuance—Ordered.]

READ—the following papers:—

G.O. Ms. No. 3985, Public Works, dated 6th October 1948.

From the Joint Director of Agriculture, Ref. No. S4 2609/51, dated 10th May 1952.

Government Public Works Department Endorsement No. 40750-J/52-1, dated 28th May 1952.

From the Chief Engineer (Irrigation), Ref. No. 5876/49 B-6, dated 3rd October 1952.

From the Board of Revenue, Res. Rt. No. 1127, dated 6th February 1953.

ORDER.

The Government have carefully examined in consultation with the Chief Engineer (Irrigation) and the Board of Revenue the proposal of the Joint Director of Agriculture that the relaxation of the Palar Basin Rules ordered in G.O. Ms. No. 3985, Public Works, dated 6th October 1948, may be extended for a further period of five years and direct that the relaxation may continue for another two years (i.e.), till 5th October 1955.

2. The Chief Engineer (Irrigation), is requested to review the position after the above period and submit a report to the Government through the Board of Revenue so as to enable them to decide whether the relaxation may be made permanent or cancelled.

3. As regards the implementation of pumping schemes the Joint Director of Agriculture is informed that as a general principle new spring channels, new large pumping schemes or a large number of pumping schemes in the Palar Basin cannot be agreed to. However, in individual hard cases there will be no objection to permit pumping schemes to serve only existing ayacuts at sites of the river or spring channels serving these ayacuts, subject to the approval of the Public Works Department in each case so as to ensure that other existing interests do not suffer thereby.

(By order of the Governor)

T. M. S. MANI,
Secretary to Government.

To the Chief Engineer (Irrigation), Madras-5.

G.O. Ms. No. 3024, Public Works, dated 22nd October 1959.

[SUBJECT.—Irrigation—North Arcot and Chingleput Districts—Palar Basin—Stoppage of electric supply to wells in Palar Basin—Relaxation of the prohibition in Palar Basin—Permitted.]

READ—the following papers:—

G.O. No. 1617, (?) (Irrigation), dated 19th June 1931.

Petition from certain M.L.As. dated 1st September 1959.

From the Chief Engineer (Electricity), D.O. No. ER/A3/R1 (v)/57, dated 9th September 1959.

From the Chief Engineer (Irrigation), D.O. No. 5320/59 H-1, dated 8th September 1959.

ORDER.

Representations have been received by Government regarding the refusal of supply of electric power by the

Electricity Department for the wells which fall within 2,000 feet from the Palar River on either side, as the Palar Basin Rules do not permit the giving of such connections and requesting relaxation of the relevant rules so that the Electricity Department may consider fresh applications for new connections.

The Government have examined the question in consultation with the Chief Engineer (Irrigation) and the Chief Engineer (Electricity) and direct that the relaxation of the prohibition now in force on the sinking of new wells or tube wells and installation of pumpsets within a minimum distance of 2,000 feet from the spring heads in the Palar Basin be granted only in deserving cases so as to enable the Electricity Department to sanction supply of power to wells coming in the prohibited area.

(By order of the Governor)

E. P. ROYAPPA,
Secretary to Government.

To the Chief Engineer (Irrigation), Madras-5.

G.O. Ms. No. 838. Public Works, dated 15th March 1963.

[SUBJECT.—Irrigation—Extension of power supply for lift irrigation from wells in and around project areas—General orders—Issued.]

READ—the following papers:—

Letter from the Chief Engineer (Irrigation), to the Chief Engineer (Electricity), No. 7438/58-A-1, dated 10th October 1958.

Letter from the Chief Engineer (Electricity), to the Madras State Electricity Board, No. ER/A3/R1 (V)/3795/58-4, dated 26th December 1958.

Letter from the Chief Engineer (Electricity), to the Madras State Electricity Board, No. 4339/1/58-14, dated 31st December 1958.

Letter from the Madras State Electricity Board, No. 8138-B/58-1, dated 3rd February 1959.

From the Board of Revenue, B.P. No. 1223, dated 21st September 1959.

Letter from the Chief Engineer (Irrigation), No. 6995/61/B-7, dated 28th May 1962.
From the Board of Revenue, B.P. No. 947 (H), dated 6th June 1962.

ORDER.

The Government direct that the following general conditions be adopted in regard to supply of power for pumpset for lift irrigation from wells in the areas surrounding irrigation project ayacuts—

(1) No well situated within 2 furlongs of any irrigation canal or one furlong of any distributary shall be given electric supply for pumping.

(2) No well shall be allowed to have pumps of more than 5 h.p. capacity.

NOTE:—Conditions (1) and (2) shall also apply to wells in areas outside the project ayacut but within two furlongs of the periphery of the ayacut.

(3) Pumps situated within the ayacut area and given electric supply will be allowed to pump supply only to areas within the ayacut and not outside such ayacut.

(4) The nature of crops raised shall be same as those permitted for the project ayacut.

(5) Conversion of oil engine pumps into electric driven pumps shall also be governed by the above conditions.

2. The Madras State Electricity Board may impose subsidiary conditions which might become necessary in consideration of varying local conditions in each project and they shall be laid down when taking up the question of extending supply of electric power to particular projects.

3. No reference to the Public Works Department need be made by the Madras State Electricity Board when installing electric pumpsets not coming within the purview of the conditions imposed above except in cases where restrictions are considered necessary in particular basins like Palar Basin, and in cases where the pumpsets installed are for pumping water direct from the river or channel in the project area, the grant of permits for which are governed by G.O. Ms. No. 3365, Public Works, dated 16th October 1957.

(By order of the Governor)

E. P. ROYAPPA,
Secretary to Government.

To the Chief Engineer (Irrigation).

CANAL LINING

By

DR. D. V. JOGLEKAR. *

Introduction.

The subject of lining of canals is very important and a Seminar on this subject was held in April 1961 at Ferozepur (Punjab) for three days, when papers by various authors were discussed. These papers have been published in the December 1962 issue of the Indian Journal of Power and River Valley Development. Important extracts of the papers, so far as they pertain to practical aspects, specifications and fundamental and basic research are given below:

1. "A UNIQUE UNDERTAKING" by Sri Kanwar Sain.

The Rajasthan Canal carries a discharge of 18,500 cusecs in a long length of 184 miles of the feeder channel. Irrigation begins at the tail of this feeder and the main canal is carried for a further length of about 300 miles in an area involving very high filling and heavy cutting. Canal lining is essential to prevent water-logging and to conserve as much water as possible by preventing percolation to make it available for more area.

For many years, particularly in the Punjab, it has been considered necessary to line the bigger channels not so much for conservation of water as for prevention of water-logging. The first experiment was tried as far back as 1916 by lining a few miles of the Lower Chenab canal by various mixes of cement plaster laid on natural bed of the canal. In course of years the canal bed rose several feet due to silting. The lining, however, was found to be intact.

The first entire canal which was designed and constructed as a lined canal in India was the Gang canal with a carrying capacity of 2,700 cusecs built in 1927. In lining this canal, locally available Kankar and Kankarlime were used. Doubts have been raised about the efficiency of

this type of lining both as to its imperviousness as well as the co-efficient of rugosity.

At the time of construction of the Haveli canal in 1937, extensive experiments were carried out on various types of linings in the laboratory, which showed that sand-wich-brick-tile lining gave better results than other types and 1¼ inch round bars were added as reinforcement in the plaster. The same type of lining was later adopted on most reaches of the Thal canal in 1940 except that the reinforcement was omitted. The same type without reinforcement was later adopted on the Bhakra canal in 1948.

The economics of lining has to be considered in each case before reaching a decision. Absorption losses in a unlined earthen channel are of the order of 8 cusecs/million square feet of wetted perimeter. In the case of light sandy soil as in Rajasthan Canal Project such absorption losses may be very much more.

The cost of lining is an important factor. Experience on the lined canals like the Haveli, the Thal and the Bhakra has shown that men and cattle cannot enter the lined canal. It has been proposed to adopt single tile lining on the bed and double tile lining on the slopes of the Rajasthan feeder.

Experience on previous canals and the recent experience on the Bhakra canal have indicated that most of the failures have occurred due to poor compaction and lack of proper drainage behind lining.

2. "PLANNING, ORGANISATION AND POLICY ON CONSTRUCTION OF RAJASTHAN CANAL PROJECT" by J. R. Tandon, Executive Engineer, Construction, Irrigation Works, Punjab.

Compaction.—In a lined canal compaction of a certain portion of its bank is essential as lining

*Adviser, Central Board of Irrigation and Power.

has to rest on this compacted zone. The compacted zone will have top width of 3.5 feet (after cutting extra compacted portion) with a side slope of 1.5:1 on the canal side and 1:1 on the outer side. Compaction of sub-grade for the lining to rest on, is highly important as any defect in this can cause a disastrous breach in the canal. To achieve this, sheep foot rollers driven by diesel tractors are used. Briefly the process consists of moistening the earth to be excavated and laying this wet earth uniformly in layers of 6 inches and 9 inches depth and rolling sheep foot rollers over it. It is essential that prior to and during compaction operations, the earth in each layer should have the optimum moisture content uniformly distributed throughout the layer. Nearly 15 to 20 rollings are enough to compact a layer of 6 inches to 9 inches possessing optimum moisture content.

Lining.—Lining will be of pucca tiles 12 inches by 6 inches by 2 inches laid in cement mortar. It has been decided that on the side slopes (which is 1.5:1) 2 layers of tiles with a sandwich plaster 5/8 inch thick will be used. First layer of tiles will be laid in 1:5 cement mortar over 3/8 inch thick cement mortar 1:5. On this layer sandwich plaster 5/8 inch thick with 1:3 cement mortar will be laid. Top layer will be of machine compressed smooth tile, wherever available laid in 1:3 over 1/4 inch cement mortar 1:3. Total thickness of the section will be 5-1/4 inches.

Lining in the bed will be one layer of tiles laid over 3/8 inch thick 1:5 mortar. On the top there will be highly smooth finish 3/4 inch cement mortar 1:3. This will give extra smoothness and improve factor of rugosity. Thickness of section will be 3-1/8 inches.

Problem reaches.—The recent damages to the lining of Bhakra main canal and Main Branch have highlighted some of the preventive measures which must be adopted against damages. The main cause of these damages to the lining on the Bhakra canals appear to be the vicinity of high level unlined channels to the lined canals. During

winter when the lined channels were dry or running low supplies, the hydro-static pressure caused by the supply in the unlined channels resulted in extensive failure of the lining. The lining is in fact not designed to withstand such a hydro-static pressure.

The other typical failures have occurred in cutting reaches. The main reasons for the same appear to be—

(i) High sub-soil water level in the surrounding country.

(ii) Poor quality or texture of the soil.

For the present the following precautions have been taken in this regard :—

(a) Provision of pressure release valves in high sub-soil water table reaches. This may have to be provided in cutting reaches also.

(b) The flattening of the side slope of the lining, i.e., 1.5:1 from 1.25:1 on the Bhakra canals.

(c) Seepage from high level channels running parallel to the canal should be reduced by lining these high level channels also.

(d) Provision of humps and gated regulators at suitable intervals for loading the lining in bed with sufficient depth of water during closure and thereby counter-balancing the uplift pressure in high sub-soil water reaches.

3. "LINING FOR CANALS WITH SPECIAL REFERENCE TO RAJASTHAN FEEDER" by R. L. Khanna, Chief Engineer, Irrigation, Punjab (Retired.)

Regions with high sub-soil water tables.—On the Rajasthan feeder, in the first 30 miles, sub-soil water table is above the designed bed. Therefore to carry out the work properly this water table has to be depressed by putting in shallow tube-wells, during the construction period. It has been found that four shallow tube-wells in a length of 1,000 feet are sufficient. A maximum period of pumping of six months is prescribed during which period not only the excavation below the sub-soil water table would be carried

out, but also the lining in a reach of 1,000 feet is completed, so that after six months water is made to stand, to the level of sub-soil water table, in the bed to prevent any damage to lining by hydraulic pressure from outside.

As an extra precaution pressure relief valves have been provided. The type of valves are different for bed and side slopes. In the bed heavier types with gun-metal valve is adopted to be fitted 500 feet apart. In the side slopes lighter type having a strainer pipe with an inclined dropping lid hinged at the end is prescribed. The lid is lifted up to relieve the pressure and sits down on the machined seat by gravity. The valves in the side slopes will be 50 feet apart in one layer where water table is only 2 to 3 feet higher than bed but will be laid in two layers if water table is higher than that.

Inspection of Bhakra main line has shown that whereas there was damage to double tile lining in the side slope at various places, there was no damage to the lining in the bed. This again shows that the pressure on the lining in the bed is negligible and therefore single tile lining can be depended upon as far as the bed is concerned.

It has been found in the experiments at Doburji (L.R.I.P.R.I., Amritsar) that a layer of tiles on the top does not reduce the temperature effect on the plaster layer underneath, though there is a time lag in transmission of heat. Therefore it has been strictly enjoined in the specifications that soon after the plaster on the bed is ready, it should be covered over with standing water which should not be allowed to dry. As a result of this precaution hardly any cracks have been noticed in the plaster in the bed and those noticed are just hair cracks which get filled up with fine silt in water. The experiments have also proved that flexural strength of single tile lining is as good as that of double tile lining.

Salt treatment.—(a) Reaches where salt contents range between 0.5 per cent to 1 per cent and sodium sulphate between 0.2 to 0.36 per cent, the bottom layer of tiles shall be laid in 1:2.5 cement mortar against 1:5 prescribed.

(b) Reaches where total salt contents range between 1.0 to 2.0 per cent and sodium sulphate between 0.37 per cent to 0.72 per cent the sub-grade will be covered by a 1 1/16 inch thick layer of 30/40 Max. Phalt bitumen.

A hump of 6 inches height will be provided in the bed at every 1,000 feet intervals to ensure that during short closures the bed of the canals does not dry and thus does not expose the plaster to the direct rays of the sun and so avoid formation of cracks.

4. "CANAL LINING"—by Jatinder Singh, Chief Engineer, Irrigation Works, Punjab and Dr. Gulbir Singh Dhillon, Executive Engineer (Designs).

The first project undertaken was the Gang canal carrying a discharge of 2,790 cusecs. The lining consisted of 6 inches thick lime concrete in which locally available kankar was used as a coarse aggregate. This lining is still existing after about 35 years of service, though in various stages of efficiency.

The second major project was that of lining the Haveli canal. This had a discharge of 5,250 cusecs and was 50 miles long. The lining consisted of two layers of tiles, 12 inches by 5-7/8 inches by 2-1/2 inches laid in cement mortar with a 1/2 inch sandwiched layer of 1:3 cement plaster. This was reinforced with 1/4 inch mild steel reinforcement laid in 1:3 plaster, forming a grid 12-1/4 inches by 12-3/4 inches in the sides and 24-1/2 inches by 25-1/2 inches in the bed. The lining failed in several reaches within the year of its completion. The failure was attributed to—

(1) Inadequate compaction of the back-fill.

(2) Lack of proper provision of drainage of the canal banks.

(3) Insufficient free board.

Nothing was found to be wrong with the lining itself. The repairs were carried out using precast cement concrete blocks.

The third major project was that of the Thal canal carrying 10,000 cusecs with a depth of 15 feet. The lining consisted of 1 : 3 : 6 cement concrete laid in slabs 15 feet by 15 feet. This was 5 inches thick in the bed and 6 inches on the sides. The concrete lining was found to be of a rather poor quality on the sides. The lining in the centre of the slab was found to be deficient in thickness (2-1/4 inches—4 inches against 6 inches specified).

(The paper then describes the proposed lining for the Rajasthan canal which has already been described in the earlier papers).

Types of lining.—Considerable research has been carried out by the Irrigation Research Institute, Punjab, to evolve an economical and sound lining of canals. The different types of the material studied can be broadly grouped into the following:—

- (a) Sodium carbonate mud plaster.
- (b) Tar or bitumen impregnated fabrics.
- (c) Soil-cement pre-cast blocks and *in-situ* construction.
- (d) Cement concrete or kankar lime concrete of thickness varying from 2 inches to 7 inches.
- (e) Tile lining with a sand-wiched layer of cement plaster or kankar lime plaster.

The conclusions from the experiments are as follows:—

Sodium carbonate mud plaster has got a very small span of useful life and reduction of seepage losses is very small.

The tar or bitumen impregnated fabric type lining was found to give a very small amount of seepage losses in the beginning even under high heads. But there was gradual deterioration of the fabric with time due to displacement of the bitumen from the fabric under hydraulic head.

The results of soil cement blocks showed that these require skilled labour for its manufacture and has got very limited useful life. The reduction in the seepage losses is also not very great. The lining is liable to damage due to cattle traffic and weed growth.

As there is no large scale manufacture of kankar lime and there are no elaborate specifications to control its quality it has not found favour with the engineers.

Essential requirements of a canal lining.—The following are the principal factors:—

- (a) cost
- (b) Impermeability.
- (c) Hydraulic efficiency or reduction in rugosity factor.
- (d) Durability.
- (e) Structural strength.

Cost.—The lining adopted should not only be economical in the initial cost but its repairs or annual maintenance cost should be small (i.e.), the overall cost and not the initial cost should be the criterion to determine the type of lining.

Impermeability.—The generally accepted criterion is that any type of lining which limits the seepage losses to 0.05 cusec/million square feet is acceptable. The tests carried out by the Punjab Research Institute show that the seepage loss in 1 : 3 : 6 cement concrete lining 4 inches thick is about 0.005 cusec/million square feet and in a double tile lining with a sandwiched layer of plaster is about 0.008 cusec/million square feet.

Hydraulic efficiency or reduction in rugosity factor.—The generally used values of the rugosity factor "N" as given by Kings for some of the lining types and also the values obtained by the Punjab Research Institute are shown in Table I below:—

Nature of surface.	Due to King.				As obtained at P.I.R. R.I. Amritsar.
	Perfect.	Good.	Fair.	Bad.	
(1)	(2)	(3)	(4)	(5)	(6)
Brick in cement mortar.	0.012	0.013	0.015	0.017	0.0185
Cement mortar surface.	0.011	0.012	0.013	0.015	0.0145
Concrete lined channel.	0.012	0.014	0.016	0.017	0.018

The Haveli canal (having double tile lining) was designed for $N = 0.0146$. When the channel was first opened the value was found to be 0.014. But after a few years the value rose to 0.018—0.020. The rise in the rugosity factor may be due to increase in roughness due to slight settlement making the surface uneven and also due to algae growth. Observations were carried out in 1959 on the Bhakra Main Line and "N" was found to vary between 0.015—0.022.

There is a general belief among engineers that if the surface of the canal lining be made highly smooth in the first instance the rugosity factor will be substantially decreased; so the section of the canal may be reduced. As has already been observed, the roughness factor goes on increasing with time. In the case of channels the thickness of the boundary layers depends on Reynold No. and the scale of roughness of the surface. According to the modern concept of the fluid flow if any surface has got undulations which lie within the thickness of the boundary layer, the frictional drag or the resistance to flow shall be independent of the nature of the surface and hydraulically this surface is classified as smooth. The equivalent roughness K of a channel can be evaluated knowing the data of the channel and rugosity factor. In the case of the Rajasthan canal "N" is taken to be 0.018 for double tile lining and 0.017 for single tile lining having smooth surface.

Durability.—Some of the principal factors affecting durability are described below:—

Movement due to moisture.—The lining is subjected to alternate cycles of wetting and drying, and the material adopted should be least sensitive to the moisture changes. The Punjab Research Institute has carried out experiments to measure the co-efficient of expansion or contraction on moistening. Some typical values are given below in Table II:—

TABLE II.

Type of lining.	Per cent change in length.	Nature of variation of moistening.
(1)	(2)	(3)
Cement concrete 1 : 3 : 6	0.008	Expansion.
Mortars (Cement, Kankar Lime and Surkhi).	0.018	Do.
Sandwiched type lining (Using Kankar lime).	0.004	Do.
Soil Cement blocks (5 per cent cement).	0.167	Do.
Bitumen impregnated Fabric (No. 510-a).	0.42	Contraction.

In the case of concrete lining joints are generally provided at suitable intervals and these joints are filled with flexible material. So this type of lining is quite durable. But bitumen impregnated fabric and soil-cement blocks are most sensitive and the lining of these materials will disintegrate on alternate cycles of wetting and drying. The action of moisture on single tile lining has not been studied experimentally until now.

Movement due to thermal changes.—The lining in a canal will be subject to direct heat from the sun during the period the canal is dry or immediately after completion of a heading and also to frost action, etc. In the case of cement concrete lining for 50 degrees F rise in temperature the change in length in a 100 feet of lining will be about 0.33 inches. As the thermal movement is considerable contraction joints are essential. In the case of double tile lining with the sandwiched layer with the plaster the movement will be about 1/2 of the above figure. The lining has got numerous joints so the Engineers hold the view that only minute hair cracks will occur and these will not be of any consequence. In the case of single tile lining the movement will be greater, and bigger cracks may develop in the top plaster. So it is proposed to cover the plaster with a 2 inches depth of water immediately after completion of a heading.

(As regards chemical action due to salts and structural stability of the tile lining, these have already been described in the previous papers).

5. "PREVENTIVE MEASURES AGAINST DAMAGES TO LINING"—by R. K. Chaudhari, Executive Engineer, Rajasthan Canal Project.

On Nangal Hydel canal which has both concrete as well as tile lining in its 60 miles length from Nangal to Rupar, preventive measures were adopted for safeguarding the lining against damages for the first time for 3 years when the canal was run in the initial stages. These proved quite effective and the same can be tried in the case of other lined channels.

Sub-grade of lining:—It has been expressed that settlement of sub-grade takes place almost invariably, when during the initial running of canal, moisture is absorbed. As a result of this settlement a cavity is caused between the lining and the sub-grade increases. It is also noticed that full settlement of sub-grade may not take place all in the one stage. If this cavity is not treated quickly the lining will get damaged. In the case of the tile lining cavity may not be distinctly visible when the lining is broken. The cavity can be seen very clearly in concrete lining. Lining is treated by cement grouting wherever any crack is noticed. Similar treatment of clay grouting is necessary for the cracks in the banks of a lined channel.

If the grouting is done in the lining on the bank in the initial stages of running of canal, the sub-grade will become sound and further damages will be avoided.

Leakages:—The method of controlling leakages through banks in a lined canal is quite different from that of an unlined canal. The depth of lined canal is too great for any human being to approach the site of leakage inside the canal and it is also not possible to locate the exact sources of leakage. The water leaking out of the bank should be examined to find out if it is clear or muddy. This can be done by allowing the water to stand for some time in a clean glass tumbler.

If the water is clear and does not bring with it any clay or silt particles, then it is considered to be innocuous. The cross section of the bank should be taken and the hydraulic gradient line should be provided adequate covering by an inverted filter. Leakage of similar nature was noticed on the Nangal Hydel Canal at the toe of the bank in high filling reach and it was treated by covering it with an inverted filter.

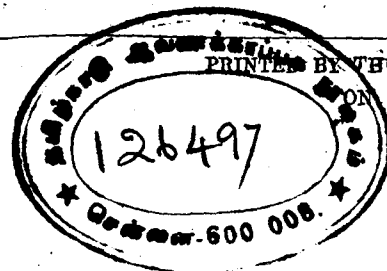
6. "SINGLE LAYER TILE WITH CONCRETE LINING FOR CANAL BEDS"—by G. P. Gupta, Executive Engineer, Rajasthan, Feeder Circle.

(See also the same article published by the author in October 1962 issue of the "Irrigation and Power" Journal of C.B.I. & P.).

The author has suggested that instead of the top layer of $\frac{3}{4}$ inch cement plaster in single tile lining proposed on the bed of the Rajasthan canal, $1\frac{1}{2}$ inches thick cement concrete 1:3:6 with the use of Shingle $\frac{3}{16}$ inch to $\frac{5}{8}$ inch can be used with advantage. Single layer tile with plaster with omission of top layer of tile on the canal bed has enough strength to withstand high velocities and test of time the important question is whether it can be laid efficiently in sandy beds and whether it can stand abrasive forces where the canal negotiates a sharp curve. Sometimes brick bats pass through the canal. These would damage the plaster top while concrete surface would remain in-tact.

On the closure of Sirhind feeder it was observed that there was a lot of silt deposit on the inner side of curves. Concrete with Shingle is quite strong to withstand all these forces especially when the canal runs in a curve. The author has shown that tile concrete lining is slightly cheaper than either double layer tile lining or single layer tile lining with cement plaster on top.

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