



Statement on the Progress of work on "Centrally Financed Multipurpose Projects" upto the 31st August, 1955

September, 1955

MINISTRY OF IRRIGATION AND POWER
GOVERNMENT OF INDIA

CONTENTS

	PAGE
Bhakra Nangal Project	1—4
Hirakud Dam Project	4—6
Damodar Valley Project	6—14
Rihand Project	14—15
Koyna Project	15—16
Kosi Project	17—20
Nagarjuna Sagar Project	20—21
Chambal Project	21—22
Tungabhadra Project	22—23
Appendices I to XII	24—42

BHAKRA NANGAL PROJECT

Detailed statements showing the progress of works upto 31-8-1955 and the programme for the working season are attached (Appendices I & II).

The salient features are indicated below:—

COFFER DAMS

Temporary coffer dams were constructed and the river was completely diverted through the right tunnel in October 1954. The left diversion tunnel has also been opened on the 11th May 1955 to take care of the increased discharge of the river during the monsoons.

Immediately after the diversion of the river, work was started on the upstream and downstream coffer dams, 215 ft. and 132 ft. high, respectively. The work was completed by May, 1955. The upstream Coffor Dam with its existing height is sufficient to cope with the maximum flood discharge ever experienced in the Sutlej at Bhakra.

Excavation for the Main Dam

Major portion of the excavation for the main dam has been completed. The cumulative progress of work so far has been 42.04 lakh c.yds. The progress during the period 1st April, 1955 to 31st August, 1955 was 6.39 lakh c.yds. as against the target of 10.55 lakh c.yds. The deficiency was mainly due to restricted space for the working of the machinery as work goes deeper in the pit and the comparatively slow process of excavation work on the upstream clay bands. As we reach the final stages of excavation slow hand methods have to be used. The concreting programme will not, however, be affected since the progress has been maintained where concreting is to be done first. Bed rock has been reached at several places in the portion of the river where the main dam is to be erected. Final trimming is going on in the abutments.

The excavation of foundations of the Power House has been completed so far as is possible at this stage. Including subsidiary excavation for roads, plant area, etc. and for the coffer dams, a quantity of 70.08 lakh c.yds. of rock excavation has been done so far, giving a monthly average of about 2.7 lakh c.yds. over a period of 26 months which is a creditable achievement.

TUNNELS

Besides the diversion tunnels, other tunnels such as the Highway tunnel, Railway concrete conveying tunnel, Grouting and drainage tunnels, Storm Water drainage tunnels, etc. have been completed.

The work of excavation of Penstock tunnels No. 2, 3 and 4 is also complete. The work is nearing completion on tunnel No. 5. Adit tunnels, from Penstock tunnel No. 3 to Grouting tunnel at R.L. 1225 Left and to penstock No. 7 on right side have been excavated in a length of 50 ft. each.

Construction Plant

A quantity of over 5 million cubic yards of concrete are to be poured in the structure of the main dam. Therefore, a huge plant for excavating; processing and cooling of the aggregate, batching and mixing of the concrete, transport of the concrete thereafter to the dam site and for placing the concrete in the structure has been planned, designed and procured. The erection of the Plant is in a very advanced stage. Work has been completed on the erection of aggregate hoppers, reclamation tunnels and cement silos. Erection of belt conveyors has been completed and trials are being carried out. The aggregate cooling plant, the aggregate classification plant and the batching and mixing plant have also been completed and are on trial. 9 out of 11 concrete cars have been completed and tested. Pre-assembly of booms of both the double cantilever cranes as well as of the revolver cranes has been completed. Revolver crane No. 1 on trestle No. 3 has been erected and the crane is being tested. Work on other items is proceeding apace.

All the engineering work for the construction plant was done in the Plant Designs Office of the Project and all structures that could trestle No. 3 has been erected and the crane is being tested. Work shops.

Concreting work on the main dam will commence in November, 1955.

Nangal Power House No. I at Ganguwal with its step-up Substation

The Power House with its step-up substation was put in commercial operation on 2nd January 1955. A quantity of 1,70,000 KWH of electric energy, with a maximum load of 12,000 KW is being generated.

Nangal Power House No. II at Kotla with the step-up Substation

Embedded parts of the turbines i.e., draft tubes, Scroll casings, pen stocks, etc., have been erected. Work in connection with the erection of turbines and generators is making good progress. Considerable progress has been made in the erection of Step-up Substation. The erection of generators and turbines will be taken up when the Superstructure is completed.

Left Bank Bhakra Power House.

It has been decided to instal five units of 90,000 K.W. each in this Power House. Tenders for the supply of Turbines and generators have been invited and are due in Electricity Branch's office in September, 1955. Specifications for the remaining equipment are being prepared.

Concreting of the main building has been completed. The erection of steel superstructure columns is in progress, as also the roofing of the main building. The concreting of the tailrace is almost complete.

Transmission System.

By end of August, 1955, 1244 miles of transmission lines ranging from 132/220 K. V. to 33 K. V. have been erected, out of which 1072 miles of line have been energised.

The construction of 244 miles of lines ranging from 220 K. V. to 33 K. V. is in progress.

Telephone Lines.

419 miles of Telephone Lines have been constructed while 40 miles of lines remain under construction.

Grid Substations.

132/220 K. V. Substations at Dhulkote and Panipat and 33 K.V. Substations at Hoshiarpur, Khanna, Jagraon, Sonapat, Phagwara, Kapurthala, Doraha, Bahadurgarh, Faridabad, Gurgaon, Urmartanda, Dasuya, Banga and Gobindgarh have been completed and energised with Nangal Power.

132 K. V. Substations at Jullundur, Ludhiana and Moga have been energised with Nangal Power. 132 K. V. Substation at Muktsar and 33 K. V. Substations at Ferozepur, Kotkapura, Malaut, Abohar, Fazilka, and Gidderbaha are ready for being energised with Nangal Power.

Work of erection of electrical equipment at Delhi (132/220 K. V. Substation) Karnal, Indri and Abdullapur (66 K. V. Substation) and Bhatinda, Pipli, Rohtak, Kurali, Dabwali, Sampla and Talwandi (33 K. V. Substation) remain in progress. Nangal supply has however been made available at Karnal, Indri, Abdullapur, Pipli, Rohtak, Kurali and Sampla, by improvised arrangements.

Local Distribution Schemes.

Out of 71 load centre towns 52 Nos., have been electrified. Under rural electrification 22 Nos., villages have been electrified.

Work of electrification remains in progress in 9 load centres and 7, villages under rural electrification.

Resettlement of oustees.

The immediate problem is the resettlement of persons displaced in Bilaspur upto R.L. 1280. The Government of Himachal Pradesh have agreed to resettle the affected persons in suitable lands within the State. The State Government are taking necessary action in the matter.

Of these Bilaspur oustees, 50 families have asked for their resettlement in village Ramnagar of Hissar district. This is being arranged.

HIRAKUD DAM PROJECT

MAIN DAM

The programme for the working season 1954-55 (October, 1954 to September, 1955) Visualized the placing of 940 lakhs cft. of earth, 92 lacs cft. of concrete and masonry and 108 lakhs cft. of rip-rap, rockfill and filter blanket on the main dam. Against this programme, the actual performance upto 31st August, 1955 has been 1196 lakhs cft. of earthwork, 124.0 lakhs cft. of concrete and masonry 113 lakhs cft. of rip-rap, rockfill and filter blanket.

In the Left Spillway the embedded parts for 40 sluice gates and 40 emergency gates have been fixed in position after final adjustment. The embedded parts for 24 sluices and 24 emergency gates have been lowered in position in the Right Spillway.

The Main Dam with its earth Spillway and Power dam Section has now taken shape and the Sky line of the dam is already an impressive sight.

DYKES

A quantity of 349 lakhs cft. of earthwork and 49 lakhs cft. of rubble packing was done during the season up to end of August 1955 against the season's programme of 378 lakhs cft. and 39 lakhs cft. respectively. This has brought the up-to-date total of earthwork on dykes to 1713 lakhs cft. (86.5 per cent.) and of rubble packing to 172 lakhs cft. (81 per cent). The slight shortfall in earthwork will be made up.

CANALS

Excavation was done to the extent of 762 lakhs cft. against 620 lakhs cft. programmed for the whole season. This has brought the total work on canal excavation to 5204 lakhs cft. (78 per cent.).

46 Masonry structures along the main canals and branches and 49 structures along the distributaries and minors have already

been completed. Work on 122 structures along the main canals and branches and 86 structures along the distributories is in progress. The work on investigation and excavation of water courses is progressing satisfactorily. A statement of progress upto 31st August, 1955 on the dam dykes and canals as compared with the targets, the programme for 1955-56 is attached (Appendix III).

POWER HOUSE AND TRANSMISSION LINES

The construction of the Hydro-power House and the erection of the Power Transmission system are proceeding as per schedule. The progress of erection of transmission lines is furnished in the statement attached (Appendix IV). The erection of penstocks draft tubes and speed rings for the 4 units to be installed at present has been completed as also the erection of three penstocks for future units. Scroll case and generator supporting ring for Unit III, Spiral casing for Unit II have also been erected. Erection of scroll case for Unit IV and Spiral casing for Unit I has been completed 65 per cent. Generator supporting ring for Unit II is under erection. 40 per cent. of the cable tunnel to 132 K.V. switch-yard has been built. Structures on Eight columns have been erected. About 50 per cent. of the work of erection of Power House Crane has been completed. Erection of power house roof trusses is in progress. Work of erection of penstocks Head gates for unit 1 to 6 was completed before the advent of the monsoon. The Power Dam and the Power House under construction with its large penstock, speed rings and scroll cases present an impressive spectacle.

REHABILITATION AND RESETTLEMENT

Altogether 249 villages are affected by the construction of the project. Of these 108 will be submerged fully.

The expected submergence during this monsoon season is, however, upto 590 contour affecting 50 villages. Evacuation of these villages has been completed. In addition, lands in 34 villages may also be affected while the busties will remain unaffected.

The Government of Orissa have reported that about 10 per cent. of the affected population have opted to resettle in the resettlement camps established by them and that the rest have made their own arrangements to resettle in the old established villages of Sambalpur and other neighbouring districts.

The total compensation payable on account of the cost of lands, houses, trees etc., which will be submerged is estimated at Rs. 8.64 crores. A sum of Rs. 3.57 crores has been offered so far as compensation and out of this a sum of Rs. 2.23 crores has been paid.

PROGRAMME FOR 1955-56

The details are given in the Statement at Appendix III. The dam will be substantially completed and irrigation water and power made available by August 1956. The project (stage 1) will be completed in all respects by June 1957.

DAMODAR VALLEY PROJECTS

I. MAITHON

1. The Statement 'A' below gives the relevant statistical data.

2. The progress of the construction of the Maithon Dam appeared to be generally satisfactory—though slightly behind the schedule—till the end of February 1955. A serious set back however came thereafter due to labour trouble. The labour first followed a go-slow policy and later struck work. The strike has since been called off. It has however resulted in substantial delay in the time schedule of the earth and concrete dams, as three valuable months were practically lost. 73.4 per cent. of the earth dam and 67.4 per cent. of the concrete dam have been done upto 31st August, 1955. Both the dams are expected to be completed substantially by the middle of 1956. The Dam as a whole is expected to be completed in all respects by the end of 1956 and will store water during the next year's monsoon.

3. The work on the excavation of the underground Power House shafts and tunnels has been progressing satisfactorily. Contracts for all major equipment for the power house have been finalised.

4. An exact idea of the progress *vis-a-vis* targets for the period October 1954 to August 1955 is given below:

A. Maithon Project

Particulars of work	Last season's programme plus programmes of July and August 1955	Progress in percentage of the programme for the period October 1954, to Aug., 55
<i>Earth Dam :</i>		
Rolled Earth	13,49,339	73.4
Borrow	15,31,747	62.2
<i>Left Dyke:</i>		
Borrow	1,97,525	79.7
Embankment	1,79,518	70.5

Particulars of work	Last season's programme plus programmes of July and August, 1955	Progress in percentage of the programme for the period October '54 to August 1955.
<i>Concrete Dam:</i>		
Concreting	2,81,900	67.4
<i>Power House :</i>		
Intake Channel Excavation	23,820	295.8
Power House Excavation	17,700	..
Tail tunnel Excavation	13,650	92.4

II. PANCHET

5. The Statement 'B' below gives the relevant statistical data.

6. The Panchet Project has to utilize Maithon earthmoving equipment and concreting plant. Work on the Project has been affected because of the retardation of the Maithon schedule, which has prevented release of much of the essential equipment. Considering the equipment available, progress is satisfactory. Concreting has started in the flanks with the batching plant from Tilaiya. Fair progress has been made on the earth dam and the dykes. A steel trestle bridge across the spillway channel has been completed for access to the Dam during the monsoon. The construction schedule is under revision. The main items of work of the Dam will be completed by July, 1958, and it is expected to store some water and generate power by that date.

7. An exact idea of the up-to-date progress *vis-a-vis* target for the period October 1954 to August 1955 is given below:

B. Panchet Project

Particulars of work.	Programme for the working season (Oct. '54 to June '55) plus programme for the months of July '55 and August 1955	Progress in percentage of the programme for the period Oct. '54 to August, 1955
<i>Diversion Channel :</i>		
Excavation Rock	1,33,078	98.7
<i>Earth Dam :</i>		
Embankment Rolled Earth	14,12,002	49%
Borrow	12,56,370	45.7

Particulars of work	Programme for the working season (October '54 to June '55) plus programme for the months of July '55 and August 1955	Progress in percentage of the programme for the period Oct. '54 to August, 1955
<i>Dykes :</i>		
Embankment Rolled Earth	6,33,744	102.8
Borrow	6,70,498	99.5
<i>Concrete Dam :</i>		
Concrete	74,891	51.9

III. BARRAGE & IRRIGATION

8. The Statement 'C' below gives the relevant statistical data.

9. The Barrage and Irrigation Project in the lower valley has made satisfactory progress. The construction of the main Barrage at Durgapur has been completed ahead of the target date. It was opened by the Vice-President on the 9th August 1955.

10. The construction of Irrigation Canals is proceeding according to schedule and the progress is generally satisfactory. Some special difficulties have to be faced of which the most important is getting timely possession of land. West Bengal Government have taken steps to expedite delivery of possession of land. Shortage of experienced contractors, difficulties in supply and movement of essential construction material, also created serious problems. The Corporation is making every effort to solve these difficulties.

11. The progress and programme of canal excavation for the period under report is as under:

C. Barrage and Irrigation

12. Progress figures are given below:—

Particulars or work	Programme for the working season (1-11-54 to 30-6-55)	Progress during 1-11-54 to 31-8-55	Progress in percentage of programme for the working season
(1)	(2)	(3)	(4)
<i>A. Earthwork :</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>	
1. Main Canal and Navigation	6,400,000	7,410,401	115.9
2. Branch Canal	3,563,200	7,371,964	207.0
3. Distributaries	4,612,500	2,945,114	63.8
4. Drainage Channel	2,200,000	410,655	18.7

(1)	(2)	(3)	(4)
B. Structures.			
	Nos.	Nos.	
1. Falls and Regulators	40	17 completed 62 under con.	
2. Locks	6	14 under con.	
3. Bridges and Culverts	63	24 completed. 48 under con.	
4. Cross Drainage works	7	10 completed. 46 under con.	

13. All preliminary arrangements have been completed regarding the supply of water for irrigating about 1,00,000 acres of land this season. The necessary earthwork regarding the excavation of canal has also been completed and a nominal rate of Rs. 7/12/- per acre has been fixed as tax for this year's Khariif irrigation by the Government of West Bengal. The additional output by this irrigation water will fetch much greater return than this nominal tax. The actual acreage under irrigation will depend on the demand for water by the Government of West Bengal.

IV. KONAR

14. The work on the Main Dam, including erection of Spillway Gates is complete. Only minor works on the road and parapet over the earth dam are to be completed. Work is in progress.

V. POWER SYSTEM

15. The Statement 'D' below gives the relevant statistical data.

16. Construction of Bokaro Thermal Power Station is complete and good progress has been achieved in the construction of transmission lines and sub-stations. The initial handicaps, due to delay in receiving equipment from overseas both by DVC and prospective consumers, have largely been overcome. The following 132 kV transmission lines have been completed:—

- (a) Bokaro-Putki-Sindri-Maithon-Kalipahari,
- (b) Bokaro-Gola-Jamshedpur-Mosaboni.
- (c) Gola-Ramgarh, and
- (d) Bokaro-Konar-Barhi.

17. In all, about 300 miles out of a total of 376 miles included in the first stage of construction have been completed. Work is in

progress on the Kalipahari-Burdwan Section (65 miles) and is expected to be completed by the end of this year. Work on the Mosaboni-Kharagpur Section (55 miles) is scheduled for completion by June 1956. Construction of the Maithon-Panchet Hill link will be co-ordinated with the progress of work on the Panchet Hill Power Station. All the 66 kV lines (32 miles) and 76 out of 91 miles of 33 kV lines have been completed. The balance of 33 kV lines will be completed according to the requirements of bulk consumers. Out of the ten 132 kV grid substations, three have been completed and four are nearing completion. Of the remaining three, the construction of the Maithon grid substation will be co-ordinated with that of the Maithon Hydro Power station and work has already been taken in hand. The first stage of Burdwan Substation for supplying power to Government of West Bengal has been programmed for completion by December 1955 and Kharagpur Substation by September/October 1956. Out of fourteen 33 kV sub-stations, eight have been completed, two are nearing completion, and the remaining four will be taken up as and when required to meet various consumers' demand. Work on the second stage of the transmission and distribution system, which covers extension to Calcutta, Barhi, Gaya, Patna and Dalmianagar is also under way. To meet the urgent requirement of the Bihar Government, a part of the material procured against the first stage has been diverted, which has enabled completion of the Konar-Barhi section (39 miles) of the 132 kV line, and partial construction of the Barhi 132 kV grid substation. Most of the equipment has been ordered, and surveys are in progress. It is expected that power supply would be made available at Calcutta by early 1957, at Gaya by the middle of 1956, and at Dalmianagar and Patna by the middle of 1957.

18. Every effort is being made to increase the system load which has already risen from 26,000 kW to 52,500 kW (on 27-7-55) and is expected to reach 70,000 kW by the end of 1956. The expectation of the load rising to 64,500 kW by December 1954, could not be realised, because two of the main consumers, namely the Tata Iron & Steel Co. and the Indian Iron & Steel Co. were unable to equip themselves in time for receiving the power. Tatas have started taking partial supply of 11,000 kW and will be in a position to take 10,000 kW additional load in the next few months.

19. The figures for the sale of power and the Revenue derived therefrom from April 1954 to July, 1955 are shown below:

D. V. C. Grid—

Energy sold	232,091,000kWh.
Gross Revenue	Rs. 115,74,000/-

Tilaiya Hydro Station—

Energy sold from April 1954 upto June, 1955	8,030,000 kWh.
Gross Revenue	Rs. 15,48,000

(Tilaiya Hydro-electric Station was integrated into the Grid at the end of June. The sale of energy and revenue from Tilaiya has been included in the figures for the Grid from July '55).

20. An exact idea of the progress up to 31-8-55 *vis-a-vis* target 1954-55 is given below:

Particulars	Target for 1954-55	Actual progress in % of col. 2		Progressive total
	D. I. Transmission miles	Lines.	%	miles
(a) 132 kV.	109		100	309
(b) 66 kV	..		..	32 (work completed earlier)
(c) 33 kV.	15		100	70
	2. Substations.			
	% of total		%	%
(i) 132 Kv Grid Substation—				
(a) Putki	38		100	100
(b) Sindri	59		100	100
(c) Jamshedpur	50		70	85
(d) Gola	97		92	98
(e) Kalipahari	60		100	60
(f) Ghatsila (Mosaboni)	100		40	40
(g) Ramgarh	75		20	15
(h) Barhi	60		67	40
(ii) 33 Kv. Receiving Station—				
(a) Hirapur	95		95	95
(b) Digwadih	100		58	58
(c) Luchipur	100		68	68
(d) A. C. C.	100		28	28

VI. SOIL CONSERVATION WORK

21. Conservation of soil and water in the Upper Valley is an important and integral part of the main scheme. Unless the soil in

the catchment area is properly conserved, the major reservoirs constructed at considerable expense are likely to be silted up prematurely. In the programme of Soil and Water Conservation the following measures have already been undertaken:

1. A research station has been established for studying the basic problems of soil erosion.
2. Airphotography, Air-mapping, Soil Survey and Land classification of the entire valley have been taken up. Nearly 75 per cent of the work of air-mapping is complete.
3. Headwater storage scheme for Irrigation, flood control and prevention of run-off silt. Investigations have been completed and a Project report for constructing about 16 small dams with irrigation channels has been drawn up and recommended for inclusion in the Second Five Year Plan at cost of approximate Rs. 2.74 crores. Meanwhile, three or four small dams have been constructed as deposit work for the Government of Bihar. They will also serve as a part of the Soil Conservation scheme.

VII. DEVELOPMENTAL ACTIVITIES

22. Activities connected with development of Cottage and Small-scale Industries are being continued. Three schemes, viz. Lock Manufacture, two Cold Storage plants for preservation of potato seeds etc. and a Central Finishing Workshop for hand-forged items have been taken up mainly with a view to encouraging use of DVC's power for small-scale industries and training up local people.

VIII. REHABILITATION

23. The latest position in regard to the rehabilitation of displaced persons is as follows:

BOKARO & TILAIYA

Rehabilitation at Bokaro and Tilaiya is complete. At Tilaiya, the D.V.C. had built 343 houses and reclaimed 4,500 acres of land for the displaced persons. Out of this 182 houses and 1,755 acres of land were not accepted by the displaced persons. This property has now been offered by the D.V.C. for sale to the Government of Bihar.

KONAR

At Konar, 5,747 persons from 6,672 acres of land and 118 houses have been effected. The people have opted for cash compensation for all houses and for 5,891 acres of land. 5,607 persons have already been rehabilitated.

Maithon

This project will displace 24,374 people from 1,588 houses and 23,139 acres of land. So far people have asked for replacement of only 1,768 acres of paddy lands and 672 acres of Tanr lands. The people will take cash compensation for the balance of the area and for all their houses. Cash compensation is being paid.

About 1,600 acres of land have already been reclaimed for rehabilitation purposes. But most of the sites reclaimed are not liked by the people. On the other hand, the sites chosen by the people are scattered over a large area and, according to the soil experts, mostly unfit for reclamation. The question of further reclamation is now under the consideration of the Corporation and the Government of Bihar and a decision is expected to be taken shortly.

Panchet Hill

The construction of this project will displace 29,884 persons from 22,670 acres of land and 2,630 houses. There has been no displacement so far. As the dam is scheduled to impound water in the monsoon of 1956, a drive to obtain final options has been organized. Originally the people were asked to give their options by the 23rd August, 1955. Only 731 families out of 5000 gave option by this date (23-8-55) 123 families want land to be reclaimed by DVC and 608 desire culturable waste land to be reclaimed by themselves. Considering the poor response, the date has been extended to 25-9-55.

IX. PROGRAMME FOR 1955-56

1. Maintenance of Bokaro Thermal Power Station and Tilaiya Hydel Station.

2. Extension of permanent colony for maintenance and operation staff at Bokaro.

3. Completion of the Maithon Dam and installation of one generating set at Maithon Hydel Station by the middle of 1956.

4. Completion of Durgapur Barrage and—

(a) Continuation of investigations and surveys of irrigation and drainage channels on Left and Right Banks.

(b) Construction of permanent colony, service roads, colony roads, electricity and water supply, etc.

(c) Acquisition of land for headworks, colonies, Left and Right Bank Canal system, drainage channel and navigation canal.

- (d) Construction of Weir and Undersluices, Right and Left Head Regulators, Guide and Afflux Bunds.
 - (e) Construction of regulators over canals and distributaries on both banks and other ancillary work relating to the excavation of canals.
5. Completing the work on roads at Konar.
 6. Land Reclamation and Soil conservation measures.
 7. Continuation of the Lock Manufacturing industry, providing for commercial out-put and execution of the Central Finishing Workshop for hand forged items, Cold Storage and Ceramic industries to encourage use of DVC's power in small-scale industries and train up local men in the use of such power.
 8. Rehabilitation—
 - Tilaiya*.—Completion of community facilities and afforestation works.
 - Konar*.—Settlement of outstanding land acquisition claims, and completion of afforestation and community facilities.
 - Maithon*.—Acquisition of land for reservoir area and for rehabilitation sites to be continued. Reclamation of waste lands for rehabilitation. Post-reclamation treatment of reclaimed lands. Provision of irrigation facilities to the reclaimed lands.
 - Panchet Hill*.—Acquisition of land for reservoir area and for rehabilitation sites to be continued. Reclamation of waste lands for rehabilitation. Post reclamation treatment of the reclaimed lands.
- Provision of irrigation facilities to the reclaimed lands.
- Construction of houses for displaced persons. Providing roads and other community facilities.

RIHAND DAM PROJECT

The Rihand Dam Project envisages the construction of a dam 270 feet high and a Power House designed to house 6 generating sets of 40,000 K.W. each, one of which will be a stand by. The project is estimated to cost Rs. 45.26 crores. The State Government have now a proposal to instal six sets of 50,000 K.W. each, five of them initially and the Sixth when the need arises.

2. An Operational Agreement was signed between the Government of India and the Government of U.S.A. on March 29, 1954, for economic aid and technical aid, to meet the foreign expenditure on

the construction of the Dam and Power House. A loan of Rs. 89 lakhs was given to the Government of U.P. during 1954-55 for financing the project. For 1955-56, a provision of Rs. 6 crores has been made in the Central Government's Capital Budget for loan assistance. A Control Board, with the Chief Minister of Uttar Pradesh as Chairman, was set up in 1954.

3. A Cement Factory which will supply cement for the construction of the Rihand Dam has been constructed near Robertsganj and it started production from October, 1954.

4. An agreement for the construction of the Dam was entered into by the Government of U.P. with the Hindusthan Construction Co., Ltd., on the 23rd May, 1955. The work is expected to be completed by 1961.

5. The progress report up to the end of June, 1955, by the Electricity and Irrigation Departments of the Government of U.P. is given in Appendix V. It has been reported by the State Government that the progress is according to the Schedule.

6. The programme for the next working season (i.e. for the period October, 1955 to June, 1956) is given in Appendix VI.

7. Property survey for the assessment of compensation to all the 108 villages to be submerged in U.P. by the construction of Rihand Dam has been completed.

KOYNA PROJECT

This project, estimated to cost Rs. 33.21 crores, provides for a storage reservoir capable of impounding 36,045 Mc.ft. of water formed by the construction of a concrete dam about 204 feet high and an underground power house with 4 units of 60,000 K.W. each i.e., with a total installed capacity of 2,40,000 K.W. at 60 per cent. load factor. The power when produced will be supplied to the power-stricken areas of Bombay and Poona.

Civil Engineering Works

The preliminary investigations were in hand till January, 1954. The work on the project such as colonies, access roads etc. was started in January, 1954.

Work has been done to the extent of about 21 per cent. of the work on the buildings, 11 per cent. on water supply and drainage, and 5 per cent. on the access roads. Machinery worth about Rs. 14.5 lakhs was purchased during the last year. The power House for supply of power to construction work is nearing completion.

The progress on the buildings was hampered by shortage of cement and the A.C. sheets. The delay in receiving the stone crusher and shortage of technical hands was responsible for the deficiency in achievement as far as roads were concerned.

The work on the water supply and drainage was also affected due to shortage of technical hands and consequent delay in starting the work.

Tenders for the construction of the Dam and excavation of Head Race Tunnel and Approach Tunnel have been invited and will be finalised before the end of 1955.

Pending decision on tenders the work will be taken up departmentally and carried out according to the programmes as far as possible. The present tentative programme will be finalised as soon as the agency for the execution of works is finally decided.

Electrical and Mechanical Works (Main)

Specifications for Turbines, Generators and the main transformers have been compiled while the specifications for transmission lines have been drafted. Survey of the transmission line route from Trombay to Thana Creek was completed and reconnaissance of the route near the Thana Creek especially across the hills near Belapur Bunder were carried out. Further studies on the Net Work Analyser were made and the report is under preparation.

Construction Power Plant

Most of the packages of the Diesel Electric Sets have been delivered at Site and are kept in storage pending erection. The power house building is under construction and is expected to be ready shortly. Foundation for set No. 1 is ready.

The erection of the 11 Kv. transmission lines was suspended after erecting poles on some sections and will be taken up in October 1955. Overhead distribution lines for the Colonies at Pophli and Jalkawadi for the completed buildings have been installed. Regular electric power supply for lighting and welding purposes at Jalkawadi has been maintained from the mobile diesel electric sets.

Orders for three more diesel generating sets of 1000 KW, sub-station equipment, line materials for construction of 11 Kv transmission lines, and necessary 11 Kv. feeder panels will be placed very shortly. Orders have been placed for construction of 11 Kv. transmission lines in the project area and also for the necessary 11 Kv. insulators.

Statements showing the progress in 1954-55 against the programme and the programme for 1955-56 are attached (Appendices VII and VIII).

KOSI PROJECT

The progress made so far in the execution of the Kosi Project is given below.

1. *Western Embankment.*—No work could be done in the northern nine miles of the flood embankment falling in the Nepal territory since the land had not been acquired. As an alternative the reconstruction and raising above flood height of the dilapidated road, running from Kanhauli to Bharda, was taken up towards the end of May. It is about 87 per cent. complete. In the Indian territory from Kanhauli Bazar to Bhufaha, a distance of sixteen miles, work is 78 per cent. complete. *Since June, the work came to stand still due to heavy rains and floods from the country side.* Work on 8 miles is being done by contractors, on 2000 feet by Shramdan and on nearly 7 miles by Public Co-operation. Besides these, there are two ring bunds, one around Nirmali and other around Mahadeomath, with a total length of about 7 miles. This is being done entirely by contractors and 90 per cent. of the work has been completed. A return bundh along the western bank of Tiljuga over a distance of about 2½ miles to divert its flow back to Kosi was entrusted to a Contractor and was started in the beginning of May, 1955. As the time was short, partial section was prescribed which has been completed all through.

The consolidation of the embankment has been done manually all through except in the Shramdan reach where water tankers, Sheep-foot rollers and tractors have been used. Consolidation Units have been used in some of the contractors' sectors also where the soil was hard. Spurs have been constructed at Nirmali and Mahadeomath and also between Mahadeomath and Kanhauli to counteract flood attacks. Further protective measures to the embankment are being provided by Kans grass roller revetment between Mahadeomath and Kamalpur, and by turfing in the rest of the embankment on the river side up to a height to control a normal flow of 5 lakh cusecs.

In all 13 gaps were left for country drainage where sluice constructions have been started in early May, 1955. Out of these sluices two in the Nirmali ring bund are 70 per cent. complete. The Saini Sikrata, one of the Dhars allowing the maximum flow towards the western embankment has been closed and protective measures have been taken. A Soil Testing Laboratory has been established at Mahadeomath which carries out tests in regard to consolidation.

Due to excessive rain in the foot hills of Himalayas on the Western side of Kosi, all the small drainage rivers, channels and tributaries to Kosi were in spate simultaneously resulting in flooding of the country side. This has been mostly drained out through the Sluice openings. Some water-logging on the country side is still existing, the draining of which is being attempted by cutting drains and connecting some of the sluice openings.

2. *Eastern Embankment*.—Nearly 9 miles were taken up and completed on the 30th June, 1955 as per reduced section and partial section. A few places were not however quite up to the mark and further work thereon was undertaken either to bring them up to full height or to make up the slope of 1 : 3 from the slope of 1 : 2 as had been prepared. Water Tankers and tractors were employed for mechanical compaction in the Gram Sewaks and portion of contractor sectors only. Further protection to the embankment is being provided by grass turfing on the river side slope. For protection of embankment against the current in front of village Bhabhini, bamboo and ball pitching and spur works have been done. The soil testing laboratory had been established along the embankment and different tests were carried out.

The crop compensation for temporary acquisition of land is being paid by the land acquisition department. Welfare facilities to labour were always provided. The work of construction of twin quarters is in progress.

3. *Afflux Bund and the Flood Embankment above Barrage*.—The eastern afflux bund above the barrage at Bhimnagar is 43,000 feet long. Beyond this it is connected by a 54,000 feet long flood embankment. The work on both these embankments is being executed through Contractors. To counteract the formation of the current parallel to the embankment at the apprehended spots, 4 permeable spurs about 3 miles long each 75 spurs 100 feet long each, and 75 spurs of 250 feet each, have been constructed. As a further measure of protection, the river side slope of the embankment is being provided with grass turfing.

4. *Barrage*.—A survey of the area just above the barrage has been completed to finalise the plans for the coffer dam and diversion of water. A detailed survey at the nose of the Chapri island has also been completed. The various small dhars coming between the Chapri island nose and the barrage axis have been investigated. An area of about 30 acres in the impervious zone had been already used for manufacture of bricks.

5. Construction of railway embankment by departmental labour was started on the 23rd March, 1955: Petty contractors were also employed on piece-meal system to do the earthwork. 16 N.G. locomotives have been arranged from the Railway Board and are under repairs. The North Eastern Railway has arranged for 52 old N.G. wagons including some coaches.

6. The total length of the access road from Bathnaha to Birpur and Bhimnagar is 28.54 miles. The earthwork in formation is in progress. About 50 per cent. of the work has been completed over a length of 27 miles, *taking into consideration new formation levels and 32' road width.*

7. The revised lay-out plan for the Birpur colony has been completed. Out of 36 'E' type quarters taken up for construction in the Birpur Colony, 2 *have been completed.*

The work on the construction of other types of quarters is in progress. The lay-out of roads in the northern half of the Birpur Colony where buildings are under construction, has been completed. The surveys for the lay-out of the colonies at Forbesganj, Bathnaha, Chatra and Dharanbazar are in progress and estimates are also under preparation.

8. The programme for the next working season is given below:

I. *Embankments.*

- (1) Completion of the incomplete earthwork on the embankments taken up last season, i.e., completion to full section of the embankments constructed to partial section. This will involve 5.23 crores cft. of earthwork.
- (2) Construction of embankment from Kanhauli to Bharda, (about 11 miles) involving about 5 crores cft. of earthwork, on the Western embankment.
- (3) Marginal embankment across Bhutahi Balan and other tributaries, involving about one crore cft. of earthwork.
- (4) Construction of Eastern embankment from Tharbita to Bhimnagar (27 miles) involving 16 crores cft. of earthwork.
- (5) Construction of Eastern afflux bundh above Barrage site (9 miles), involving a total quantity of about 3.6 crores cft. of earthwork. It is proposed to tackle this work with the help of machines.
- (6) Construction of 12 miles of flood embankment above the afflux bund involving 5 crores cft. of earthwork.

The above six items will involve 35.83 crores (or 36 crores approximately) of earthwork, against about 18 crores of cft. done during the last working season.

In addition it has been suggested that the lower portion of the Western embankment constructed so far should be extended by 12 miles (from Ghoghardiha to Madhepur) and the Eastern embankment by 6 miles down below Supaul. For completion of this additional work, the work on the canals may be postponed to a later stage. Final decision on the additional programme has not yet been taken. Each mile involves roughly 80 lakh cft. of earthwork.

II. *Other parts of the programme.*

The other parts of the programme contemplate an expenditure of 69 lakhs on the Railways, 26 lakhs in the Roads Division, 37.4 lakhs in the Camp Division and 8.7 lakhs in the Investigation and Research Division. Two Divisions will be created for detailed investigation of canals, distributaries and diversion channels, work on the canals may, however, be postponed if the additional 12 miles of embankments on the West and 6 miles on the East are taken up, because of limitations of technical personnel.

NAGARJUNASAGAR PROJECT

The first stage of this Project has been included in the First Five-Year Plan. The Project comprises the construction of a masonry dam across the Krishna at Nandikonda and two canals taking off from the reservoir on the left and the right banks in Hyderabad and Andhra States respectively. The average height of the spillway dam above foundation level will be 302 ft. The cost of the dam to a partial height and part of the two canals is estimated at about Rs. 75 crores. The cost of the dam will be shared by the two States in proportion to the quantities of water utilised through the twin canals. The first stage of the scheme will irrigate about 2 million acres of land in the districts of Guntur, Kurnool and Nellore in Andhra and Khammam and Nalgonda in Hyderabad State.

2. The Nandikonda Control Board has been set up *vide* this Ministry's Resolution No. DW IV 15(1)/55 dated the 17th June, 1955, but it has not yet started functioning. The Board will draw up a construction schedule for the execution of the Project.

3. The Project has not yet been sanctioned but preliminary works are in hand. On the Andhra side, an approach road from Macherla to Dam Site, to a length of 17 miles has been laid. Bitumen surfacing of this road has been sanctioned. Collection of metal etc., is in progress. The Electric Sub-Station at Macherla and the necessary

transmission line have been completed. Estimates and plans for buildings and water supply at the dam site are under preparation. The estimates for a rail-cum-road bridge across the Krishna and for the survey of a railway line from Machrela to dam site are under consideration. The Andhra Government have stated that they have spent about Rs. 8 lakhs on preliminary works so far. A provision of Rs. 1 crore has been made in the Central Budget for 1955-56 towards loan assistance to the participating States of Andhra and Hyderabad to meet the expenditure on the project.

4. The Government of Hyderabad have set up a Survey Division which is engaged on the detailed surveys for the canal. The survey has been done to a length of 20 miles. The above division is also in charge of the construction of an Approach Road to the Dam Site. This work, estimated to cost Rs. 12 lakhs, has been let out in June, 1955. In the meantime a temporary Service Road has been laid. The expenditure to end of August, 1955, both on the roads and the Survey Division is about Rs. 4.4 lakhs.

CHAMBAL PROJECT

The Chambal Project is a multi-purpose project wherein the States of Madhya Bharat and Rajasthan have equal interests. The first stage of the Project, estimated to cost Rs. 48.03 crores consists of:—

- (a) Construction of Gandhi Sagar Dam across the Chambal at the boundary of Madhya Bharat and Rajasthan to create a reservoir having a gross capacity of 5.73 m.a. ft. and a live storage of 5.06 m.a. ft. It is a masonry gravity dam about 200 ft. high above the river bed and 1,680 ft. in length at the top.
- (b) A Power Station at Gandhi Sagar Dam to accommodate ultimately 5 units of 23000 kw each, three units being installed in the first stage.
- (c) H. T. Transmission line aggregating to about 772 miles for transmitting power in Madhya Bharat and Rajasthan.
- (d) Construction of Kotah Barrage across Chambal above Kotah City with canals taking off on either side. The total length of the barrage will be 1970 ft. at the top.

2. A loan of Rs. 60 lakhs was given to the Madhya Bharat Government and Rs. 50 lakhs to the Rajasthan Government during the year 1954-55. For the current financial year, Madhya Bharat have estimated their requirements at Rs. 3 crores and Rajasthan Government at about Rs. 2 crores. Adequate provision exists in the Central Government's Capital Budget for 1955-56 to meet the full requirement of both the States by way of Central loan.

3. The progress report up to the end of August, 1955, by the Governments of Madhya Bharat and Rajasthan is given in Appendices IX and X.

4. The programme for the next working season, i.e. for the period October, 1955 to June, 1956, is given in Appendix XI.

5. The Chambal Control Board, with the Union Deputy Minister of Irrigation & Power as Chairman, was set up in April, 1955. The Board has met five times so far, the next meeting being scheduled for the 14th October, 1955.

TUNGABHADRA PROJECT

(Board Area)

PROGRESS

The Tungabhadra dam is almost complete. The balance of work (installation of spillway shutters and the overhead bridge) is expected to be completed by June, 1956.

The work on the canals in the jurisdiction of the Tungabhadra Board has already been completed.

As regards the hydro-electric scheme, excavation for the power house is complete and concreting work is in progress. Approach roads and temporary buildings have been constructed. On the power canal, excavation and lining of 13 miles of the canal have been executed. Work is in progress on the remaining portion (3 furlongs) of the canal.

Preliminary work is in progress on the erection of transmission line, sub-stations, low pressure pipe lines etc.

Details of the programme and progress during the last season are given in the statement attached (Appendix XII).

*Programme for the next season (i.e. October, 1955 to June, 1956)
for common works under the Tungabhadra Board*

Dam Power House.—The Power House structure upto stanchion level will be completed by December, 1955. The erection of overhead gantry crane will be completed by January, 1956. Side lining and concreting of tail race pond will be completed by December, 1955. The erection of transformers will be completed by February, 1956. Superstructure of the power house will be completed by April, 1956. Erection of turbines and generators will be in progress.

Canal Power Development.—Excavation for the forebay will be completed by December, 1955, as also the intake structure for the Low Pressure pipe lines.

Excavation for canal power house will be completed by October, 1955. Concreting the power house sub-structure will be completed by March, 1956. The 75th overhead Gantry crane will be erected by June, 1956. Transformers will be erected by April, 1956.

Sub-stations.—Extensions to Bellary sub-station will be completed, including the construction of control house, by January, 1956.

APPENDIX I

STATEMENT SHOWING PROGRESS OF WORK ON BHAKRA NANGAL PROJECT TO THE END OF AUGUST 1955 AND PROGRAMME FOR THE WORKING SEASON 1955-56

Item of Work	Total estimated quantity (Unit)	Target date of completion	Progress upto 31-3-55	Programme during working season 1955-56 (1-4-55-31-3-56)	Programme during working season 1955-56 (1-4-55-31-8-55) (Qty. : Percentage for the period)	Progress during working season 1955-56 (1-4-55-31-8-55) (Percentage for the working season)	Cumulative progress to the end of August 1955 (Qty. : Percentage)	Programme for the remainder of the working season 1955-56 (1-7-55 to 31-3-56)
1. Means of Communications (Roads, Rails, Telephones, Telegraphs, etc.)	..	..	100%	..	..	..	100%	..
2. Diversion Tunnels	..	..	100%	..	..	..	100%	..
3. Coffor Dams	9,29,000 C. yds.	31-5-55	5,87,400 C. yds.	3,41,600 C. yds.	3,41,600 C. yds.	3,41,200 C. yds.	9,28,600 C. yds.	This includes cutting & filling both.
4. Excavation	51,60,000 C. yds.	31-1-56	35,65,000 C. yds.	13,72,000 C. yds.	10,55,000 C. yds.	6,39,000 C. yds.	42,04,000 C. yds.	3,17,000 C. yds.
5. Construction Plant	100%	31-3-57	77%	20%	5%	17%	94%	3%
6. Concrete	51,11,000 C. yds.	Feb. 1960	..	2,95,000 C. yds.	..	..	..	2,95,000 C. yds.
7. Power Plant	..	..	..	..	..	..	..	..

Excavation & Concrete i.e. Civil Works are already included in items 4 & 6 above.

APPENDIX II

STATEMENT SHOWING PROGRESS OF WORK ON BHAKRA NANGAL PROJECT (ELECTRICAL PORTION) TO THE END OF AUGUST, 1955 AND PROGRAMME FOR THE WORKING SEASON 1955-56

Item of work	Total estimated quantity	Target date of completion	Progress upto 31-3-1955	Progress during working season 1955-56 (1-4-55-31-3-56)	Progress during Programme working season 1955-56 (1-4-55-30-6-55)	Progress during working season 1955-56 (1-4-55-31-8-55) (Percentage for the working season)	Cumulative progress to the end of August, 1955 Qty. : Percentage	Programme for the remainder of the working season, 1955-56 (1-7-55 to 31-3-56)
						Qty. : Percentage for the period)		
1. Left Bank Power House at Bhakra.	5 Units of 90000 K. W. each.	Tenders for the Generators and Turbines have been invited.						
2. Nangal Power House No. I at Ganguwal.	2 Units of 24000 K. W. each.	The work has been completed and the Power House commissioned for commercial operation. on 2nd Jan., 1955.						
3. Nangal Power House No. II at Kotla.	2 Units of 24000 K. W. each.	1955-56	Embedded parts of Turbine erected.	Continuing erection of Kotla Power House.	(i) Embedded parts of Turbine erected. (ii) Erection of Turbines & Generators remain in progress. (iii) Considerable progress has been achieved on the erection of Step Up Substation.	Erection of Power House machinery and equipment.		
4. Transmission lines 132, 66 & 33 K.V.	1768 miles.	1956-57	1165 miles.	332 miles.	79 miles.	1244 miles.	253 miles.	
5. Telephone Lines 33 K.V. & 11 K.V.	768 miles.	1956-57	271 miles.	233 miles.	148 miles.	419 miles.	85 miles.	
6. Grid Substation 132, 66 & 33 K.V.	73 Nos.	1956-57	14 Nos.	27 Nos.	12 Nos.	26 Nos.	15 Nos.	
7. L. D. Schemic	71 Nos. Load centre towns plus rural electrification	1956-57	46 Nos. Load centre towns plus 22 Nos. villages under rural electrification.	19 Nos. Load centre town plus rural electrification.	6 Load centre towns.	51 Nos. load centre towns plus 22 Nos. villages under rural electrification.	13 Nos. Load centre towns plus rural electrification.	

APPENDIX III

STATEMENT SHOWING THE PROGRESS OF WORKS ON THE HIRAKUD DAM PROJECT TO THE END OF AUGUST 1955 AND PROGRAMME FOR THE WORKING SEASON 1955-56

Item of work	Total estimated qty.	Target dt. of com- pletion	Progress upto Sept. 1954	Program- me during w/season 1954-55 (Oct. '54 to September '55)	Progress during the w/s 1954-55 upto end of August 1955		Cumulative progress to end of August '55		Programme for the working season 1955-56 (Octo- ber '55 to Sept. 1956)		Remarks
					Qty.	percentage	Qty.	percentage			
Quantity in lacs cft.											
Main Dam:											
Concreting & Masonry	381.0	" '57	222.0	92.0	124.0	134.8	346.0	90.8	31.0	}	*
Earthwork	4416.0	" "	2265.0	940.0	1196.0	127.2	3461.0	78.3	772.0		
Rockfilling, Riprap & filter blan- ket	473.0	" "	234.0	108.0	113.0	104.6	347.0	73.4	73.58		
Dykes:											
Earthwork	1977.0	" '56	1364.0	378.0	349.0	92.3	1713.0	86.5	234.2	}	
Rubble Packing	212.0	" "	123.0	39.0	49.0	125.6	172.0	81.0	34.2		
anals.											
Earthwork	6667.0	June '57	4442.0	620.0	762.0	123.0	5204.0	78.0	852.0		

*Programme for 1955-56 has been altered in the light of progress achieved so far and actuals remaining to be done.

APPENDIX IV

TRANSMISSION LINES (PROGRESS TO END OF AUG. 1955)

Serial No.	Name of Work	132 KV D.C. Line from Power House to Rajgangpur (about 80 miles)	132 KV D.C. Line from Power House to Alluminium Factory (about 4 miles)	132 KV S.C. Line from Rajgangpur to Barajamda (about 60 miles)	132 KV S.C. Line from Power House to Cuttack (about 160 miles)
		Progress in %	Progress in %	Progress in %	Progress in %
1.	Tower assembly & erection	About 95%	About 90%	About 67%	About 38%
2.	Paying out, stringing & sagging of conductors	„ 41%	Nil	„ 31%	„ 5%

Work on 66 K.V. line has not yet been started.

Construction of Sub-station colonies is in progress at Jharsuguda, Rajgangpur, Barajamda and Talcher.

RIHAND

APPENDIX V

I. ELECTRICITY DEPARTMENT

Progress up to the end of June, 1955

1. *Main Power House.*—The specifications for Power Station Plant have been prepared and are under print. They are expected to be ready for issue by the end of August 1955.

2. *Construction Power Plan.*—(a) 3000 KW Diesel Station:—Specifications for diesel station plant were prepared. Order for the plant has been placed and equipment is expected to arrive shortly. The site for the diesel station at Pipri has been selected and the building work is in progress.

(b) 6000 KW Steam Station:—Orders have been placed for manufacture and erection of the plant.

Site for the steam station at Choppan has been selected. Action is being taken to acquire land and proceed with the construction of temporary buildings. Arrangements for the power Station building are being made.

3. *132 and 66 KV Lines and Sub-stations.*—A number of lay outs of Transmission system were examined and two different lay outs were studied on the Net Work Analyser Board at Bangalore. The final lay out based on the results of this study has been prepared.

Specifications of 132 KV Pipri-Banaras line and 66 KV Sultanpur-Sohwal and Sohwal-Gonda lines have been prepared. Specifications of 132 KV Pipri-Banaras lines are under print.

Survey of the route of the Transmission line between Pipri and Churk has been completed. The various sites for the Sultanpur 132 KV Sub-station have been examined.

4. *33 KV lines and sub-stations.*—33 KV lines and sub-stations for energising tube wells in Allahabad, Mirzapur, Jaunpur and Banaras District:—Design of supports for the line has been finalised and fabrication of cross arms and drilling of rails is in progress. Survey of lines is being done out.

Orders for Transformers and Switch gear for Sub-stations and conductor and insulators for the line have been placed.

5. *Choppan-pipri construction Feeder*.—The design of support for this double circuit 33 KV line has been finalised and the fabrication of structures taken in hand. Tenders for conductors and insulators have been called and orders placed.

Survey and erection of line has started.

6. *Temporary Diesel Power Station at Pipri*.—For such time as the 3000 KW Diesel Station at Pipri is not ready, a temporary diesel power station with a few small diesel generating sets has been installed at Pipri and is taking load.

7. *H. T. and L. T. Lines at Pipri and Robertsganj*.—The 11 KV lines at the Dam site have been completed and are ready for energising. The work on L. T. lines is in progress.

The 11 KV line from Churk Cement Factory Power House to Robertsganj has been completed and 25 KVA 11/0.4 KV Sub-station at Robertsganj is ready. L. T. distribution system for colony at Robertsganj is nearly complete.

8. *Electrification of buildings at Pipri*.—The work of electrification of temporary buildings at Dam site is in progress.

II. IRRIGATION DEPARTMENT

The detailed investigations for the concrete dam and appurtenant works were carried out and designs finalised in 1949.

The access road from Robertsganj to the Dam site had been constructed in 12 feet width and is being widened to 20 feet width.

The work on the Highway Bridge across the Sone is progressing satisfactorily. Most of the foundation wells have been sunk.

The excavation for the foundation of the Dam has advanced considerably.

The work of Construction Camp and its ancillaries at the dam site and storeyard at Robertsganj remained in full swing. 880 R.L. cantour, which represented the full reservoir level, was marked for the area to be submerged in Uttar Pradesh. Property survey for the assessment of compensation of all the 108 villages to be submerged in U.P. by the construction of Rihand Dam was completed.

The Cement Factory at Churk which will supply cement for the construction of Rihand Dam started functioning in October, 1954.

A Wireless Station has been established at site and telephone and telegraph lines are being erected by the Post and Telegraph Department to connect the Dam site with their system.

RIHAND**APPENDIX VI****I. ELECTRICITY DEPARTMENT**

Programme for the working season October 1955 to June 1956.

1. Tenders for Rihand Dam Power Station Plant, will be invited, received, comparative statements prepared and orders for the plant will be placed.

2. The 3,000 KW Diesel Power Station at the Dam site will be completed and will start taking load.

3. A part of 6,000 KW steam station plant will arrive and erection work will start.

4. Interim Diesel Power House at the dam site will continue to supply construction power and distribution system will be extended.

5. Gantry Crane at Robertsganj will be erected for loading and unloading heavy equipment.

6. Tenders for 132 KV and 66 KV line will be called and finalised.

7. Fabrication of towers for 66 KV lines will be started.

8. Materials will be arranged for construction of 33 KV and 11 KV lines and construction work taken up.

9. The work of acquisition of land for sub-stations and buildings will be completed.

10. The work on the construction of the buildings under transmission and transformation will start.

11. The major river crossings will be surveyed and designs prepared.

12. The construction of 33 KV Choppan-Pipri Construction feeder will be completed.

13. Electrification of temporary and permanent buildings will be carried out as the buildings become available.

II. IRRIGATION DEPARTMENT

*Programme for the working season October 1955 to June 1956
October 1955 to March 1956.*

The work on access road and the Sone Bridge will be completed.

Stripping of the Quarry will be started and arrangements for the construction machinery will be finalised by Messrs. The Hindustan Construction Co.

The Construction Camp and its ancillaries will be completed.

Work on the Railway Siding at Robertsganj will be taken up.

The reservoir level will be marked in the Vindhya Pradesh.

The surveys for the rehabilitation of the persons to be displaced from the reservoir area will be finalised and the plans prepared.

Action for the acquisition of land to be submerged in the reservoir area and work on the clearance of the reservoir area will be started.

A Diesel Station will be erected at the Dam site and the construction of a Steam Station at Churk and its transmission lines to the dam site will be started.

April 1956 to June 1956.

The construction of the Railway Siding at Robertsganj will be completed and the access road from Robertsganj and the Cement Factory to the dam site will be opened for heavy traffic along the Sone Bridge.

Work on the excavation of foundation and opening up of the quarry will be continued.

The construction of the Steam Station at Churk will be in full swing.

Erection of the construction plant will be started.

Contractor's Construction Camp and roads etc. will be completed by June 30, 1956.

Work on the Rehabilitation scheme, acquisition of land to be submerged in the reservoir, and reservoir clearance will be continued.

APPENDIX VII **CIVIL ENGINEERING WORKS**

Financial Years		June 1954-55	Programme Oct. 1955 to June 56		
	Quantity	Units	Cost Rs. Lakhs	Progr- amme	Achieve- ment
I. Colonies & Roads :					
Buildings			125.0	30%	21.3% 29%
Access Roads			70.0	12%	4.7% 33%
Water Supply & Drainage.			40.0	15%	11.1% 41.5%
II. Dam & Appurtenances :					
Excavation in (cover Burden.	11.00	MCFT	15.65	2.1 MCFT	2.1 6.3 MCFT
Excavation in Rock .	19.75	MCFT	48.80	..	.. 6.6 MCFT
Masonry	12.5	MCFT	163.49	..	.. 0.5 MCFT
III. Underground Excavation :					
Head Race Tunnel	12200	Feet	87.94	..	.. 1000 Rft.
Tail Race Tunnel	6600	"	62.96	..	.. 500 Rft.
Plus cut & Cover					
Approach Tunnel	3600	"	20.30	..	.. 1000 Rft.

APPENDIX VIII

Programme for period October 1955 to June 1956

KOYNA ELECTRICAL WORKS.

Particulars of Works	Total estimated quantity Rs. lakhs	Financial Year		Programme for the period Oct. '55 to 30-6-56 Rs. lakhs	Remarks
		Programme (1-4-55 to 30-3-56) Rs. lakhs	Progress till 31-8-55 Rs.		
I. Electrical & Mechanical Works.					
G-Generation of Power					
(i) Generating Plant	335.57	..	..	..	The Programme is based on revised figures of Budget. *This expenditure now increased due to purchase of equipment of higher capacity to meet higher load demands & subject to delivery of equipment in time.
(ii) Slip-up Plant	180.94	..	..	..	
T-Transmission					
(i) Transmission Line, tele-communication lines & line camps.	308.03	4.54	..	5.16	
(ii) Receiving Station Sub-Station and Staff quarters	234.35	..	..	..	
II. Establishment	79.42	6.15	75200	6.94	**No allotment has been sanctioned under the minor Head Tools & Plant. Additional allotment of Rs. 5400/- has been shown against T-(i) & iv (i).]
III. Tools & Plant	10.59	..	..	..	
IV. Construction of Temp. Power Plant & Transmission Lines					
(i) Works	140.00	47.50	107700	52.48	
(ii) Establishment	3.00	1.70	15200	1.97	
(iii) Tools and Plant	0.40	..	..	..	
TOTAL	1192.30	59.89	198100	66.55	

83

APPENDIX IX

CHAMBAL VALLEY DEVELOPMENT

MADHYA BHARAT

*Statement showing targets and progress up to the end of August, 1955
for Gandhi Sagar Dam and Right Main Canal in Madhya Bharat*

Serial No.	Works item	Target fixed from June 1954 to August 1955	Actual Progress done during that period	Percentage of progress Target
1	2	3	4	5
1.	Excavation :—			
	(a) for foundation of Gandhi Sagar Dam	14.00 lakh C.ft.	26.00 lakh C.ft.	185.7
	(b) For Draft Channel	7.50 „	11.62 „	154.9
2.	Masonry and concrete for Gandhi Sagar Dam	22.67 „	26.48 „	116.8
3.	Earthwork for Right Main Canal	7.34 lakh C.yds.	8.44 lakh C.yds.	114.9

NOTE.—The target figures mentioned in column 3 have been modified as per the revised phased programme of works submitted to the Chambal Control Board.

Details of progress are given below.

GANDHI SAGAR DAM

Excavation for the foundation of the dam is complete for about two third of the length in the middle portion. Excavation on the right flank has been completed. Excavation on the left flank is progressing satisfactorily; about 49 lakh C.ft. of excavation having been completed so far.

Masonry work was started in March, 1954. To the end of June 1955, over 26 lakh C.ft. of Masonry was laid. The dam has risen about 20'-0" over the bed of the river. The progress is according to the schedule, in spite of the loss of about a month due to late monsoons in 1954 and large exodus of labour in the months of April and May 1955 due to the marriage season before *Sinhaatha*.

GANDHI SAGAR POWER STATION

Civil Engineering works of the power house are being executed along with the construction of dam. 70% of the excavation work in the draft channel has been completed.

Specifications for the generating and control equipment and the penstocks have been finalised. Tenders are being invited.

RIGHT BANK MAIN CANAL

(1) The preliminary investigations for the alignment of Chambal Canal in Madhya Bharat, starting from Parbati River near village Barodia have been completed.

(2) The surveys for all the 15 Major Drainage works are complete and other investigations are in progress.

(3) The alignment of the Main Canal has been finally located and demarcated on the ground for the first fifty miles upto Girdhpur.

(4) The surveys and investigations on Ambah Branch Canal, Morena Branch Canal, and Mau Branch Canal have been completed.

(5) The photographic and contour surveys of the Chambal Canal Commanded area in Madhya Bharat are complete.

(6) The detailed estimates for 5 to 15 of the Canals have been technically sanctioned.

(7) Land for the first 29 miles of Canals has been acquired and steps have been taken to acquire the lands from mile No. 29 to 36.

(8) Tenders for earthwork in the first eighty-five miles of the Canal have been called for and work allotted upto the 20th mile. Previously the work was allotted on piece work system in the first fifteen miles. The construction of the Main Canal started on 1-12-1954. 200 Lakhs C.ft. of earthwork, estimated to cost Rs. 6.5 lakhs approximately has been completed upto the end of June 1955. Earthmoving machinery consisting of two Scrapers, three Tractors (two of them with dozers), two Sheep-Foot Rollers, and connected equipment have recently been put into commission. Most of the earthwork done so far has been by manual labour.

(9) The work on Parbati aqueduct has been allotted on contract. This structure is estimated to cost Rs. 45 lakhs approximately. The preliminary arrangements of accommodation for the contractor's personnel and office have been completed. The collection of materials is in progress, and the machinery required for construction work has started arriving.

(10) The constructive buildings required for the construction and maintenance staff estimated to cost about 6.5 lakhs is in progress. These buildings are expected to be completed in all respects by the end of December, 1955.

APPENDIX X

CHAMBAL PROJECT KOTAH (RAJASTHAN)

Statement showing targets and progress achieved during the Working Season October, 1954 to end of August, 1955.

Serial No.	Particular of work	Estimated quantity in (lakh C. ft.)	Progress till 30-9-54 in (lakh C.ft.)	Programme for the working season from 1-10-54 to 31-8-55 (lakh C.ft.)	Progress achieved during 1-10-54 to 31-8-55 (lakh C.ft.)	Reasons for difference)
1	2	3	4	5	6	7
I. Kotah Barrage						
1	Excavation in hard rock,	165	10	5.60	8.80	Lack of labour due to rains during July and August, 1955.
2	Stone masonry and concrete.	19.5 } 23.0 }	1	4.00	3.00	
3	Earth Work	170	..	..	30.00	
II. Canal System						
1	Excavation in hard rock.	313	24	68.30	74.34	
2	Stone masonry and concrete.	178.	..	14.60	16.41	
3	Earth Work	6,600	..	242.00	66.94	Dearth of labour and non-continuance of work due to rains. The machinery also could not be used due to soil being rod-den.

Details of progress are given below:—

Kotah Barrage.—The construction of retaining wall which was started during the first week of April, 1955, was continued. The total quantity of masonry done up to the end of August 1955 on retaining wall, core-wall and abutments was approximately 4.0 lakh Cft.

The foundations of the Kota Barrage for the earthen portion after being isolated from the outside flow were filled up with earth available on the left bank of the river. This involved about thirty lakh Cu. feet of earthwork in reaching upto the level El.765.00. All earthwork was done with the help of earthmoving machines. Final

designs of the gates of Kota Barrage 19 Nos. (40' x 40') are nearing completion as also the design of scouring sluices and the head regulator of the two main canals taking off from the barrage.

Right Bank Main Canal.—Rock cutting in the head reach of the Canal is nearing completion. The Canal below the Kota City tank runs in masonry lined sections and work in this reach upto Ch. 215 is making satisfactory progress.

Construction of Cross Drainage works on the Canal across Kansawan, Alnia rivers and the Tekra and Umedganj nallas is steadily progressing.

Upto date progress is as follows:—

Item of work	Total quantity to be done	Upto date quantity done
Rock cutting	232 lakhs C.ft.	63·42 lakhs C.ft.
Stone masonry and concreting	118 lakhs C.ft.	14·40 lakhs C.ft.
Earthwork	5500 lakhs C.ft.	55·54 lakhs C.ft.

Left Bank Main Canal.—Rock cutting in the reach Ch. 0 to 50 is nearing completion and excavation of Bundi Branch Canal is well in progress between Ch. 110 to 130 and beyond. The work on cross drainage works on three major aqueducts was in good progress. Up to date progress is as follows:—

Item of work	Total quantity to be done	Up to date quantity done
1. Rock cutting	81 lakhs C.ft.	34·92 lakhs C.ft.
2. Stone masonry and concreting	60 lakhs C.ft.	2·01 lakhs C.ft.
3. Earthwork	1100 lakhs C.ft.	11·40 lakhs C.ft.

Canal Colony at Anta.—Work on the construction of a Canal Colony at Anta (a town midway on the Right Main Canal) is nearing completion.

CHAMBAL APPENDIX XI

CHAMBAL VALLEY DEVELOPMENT (MADHYA BHARAT)

Programme for the period from October, 1955 to June, 1956.

Unit	Works item	Programme from October 1955 to March 1956	Programme from April 1956 to June 1956	Programme from October 1955 to June 1956
1	2	3	4	5
Gandhi Sagar Dam	1. Excavation for foundation of dam.	16.0 lakh Cft.	8.0 lakh Cft.	24.0 lakh Cft.
	2. Masonry for Gandhi Sagar Dam.	28.0 lakh Cft.	20.0 lakh Cft.	48.0 lakh Cft.
Gandhi Sagar Power Station.	Excavation in the draft channel.	4.0 lakh Cft.	2.0 lakh Cft.	6.0 lakh Cft.
Right Main Canal.	1. Earth work.	580 lakh Cft.	325 lakh Cft.	905 lakh Cft.
	2. Rock Cutting.	40 lakh Cft.	20 lakh Cft.	60 lakh Cft.
	3. Masonry for aqueducts concrete etc.	5.5 lakh Cft.	4.0 lakh Cft.	9.5 lakh Cft.

APPENDIX XI—contd.

CHAMBAL VALLEY DEVELOPMENT

(Rajasthan State)

(All quantities in lakhs of Cft.)

Construction Programme

Particular of work	Estimated quantity	FIRST PART		Total	SECOND PART	Remarks
		Oct. 1955 to March, 1956			April, 1956	
		Oct. 1955	Jan. 1956		to	
		to	to		to	
		December	March		June, 1956	June 1956
		1955	1956			

Kotah Barrage

1. Excavation in-hard rock for foundations.	165	6.0	6.0	12.0	15.0	27.0
2. Coursed stone Masonry.	19.5	3.0	4.5	7.5	4.5	12
3. Concrete work in founs, faces and piers.	23.0	4.0	6.0	10.0	6.0	16.0
4. Earth work—Impervious and semi impervious fill for earthen dam.	170.0	..	..	..	..	

Left Bank Main Canal and its Branches

(Quantities in lakhs of Cft.)

1. Rock cutting Left Main Canal.	81.0	8.0	8.0	16.0	8.0	24.0
2. Earth Work.	1,100.0	150.0	150.0	300.0	150.0	450
3. Concreting and stone masonry.	60.0	5.5	5.5	11.0	5.5	16.5

Right Bank Main Canal

(Quantity in lacs of Cft.)

1. Rock cutting.	232.0	20.0	30.0	50.0	25.0	75.0
2. Earth Work.	5,500.0	300.0	500.0	800.0	500.0	13,00.0
3. Concreting and stone masonry.	118.0	10.0	10.0	20.0	10.0	30.0

APPENDIX XII

**PROGRESS REPORT ON TUNGABHADRA IRRIGATION SCHEME
(BOARD AREA)**

	Total target	Work completed till October, 1954.	Progress October, 1954 to August, 1955	Balance re- maining to be done
1. Excavation	12,572 Units	12,572 Units	Completed	..
2. Drilling high pressure holes	20,000 Rft.	18,990 Rft.	845 Rft.	1 65 Rft.
3. Grouting high pressure holes	Do.	16,156 Rft.	987 Rft.	189 Rft.
4. Concreting	Not estimated	6,191 Units	134 Units	..
5. Masonry	1,59,604 Units	1,51,657 Units	910 Units	..
6. Main Canal Excavation	8,50,000 Units	6,98,366 Units	Completed	..
7. Hagari Aqueduct	50,00,000 Rupees	Completed	Completed	
8. Other Masonry Works	328 numbers	328 numbers	Do.	
9. Shutters fixed in position				
Andhra — Mysore side 15 Nos.	..	3 Nos.	12 Nos.	

PROGRESS REPORT OF TUNGABHADRA HYDRO-ELECTRICITY SCHEME FROM

1 OCTOBER, 1954 TO AUGUST, 1955.

(BOARD AREA)

Dam Power House Works

I. Works completed

1. Excavation for the foundations of Power House.
2. Excavation for the Tail race pond.
3. Construction of retaining walls and revetments for the Transformer yard.
4. Formation of approach roads to Power House and to Vanka Camp.
5. Construction of 30 Mistries and 12 Peons quarters.

II. Works in progress

1. Concreting the Tail Race Pond.
2. (a) Concreting the Tail Race Pond (90 per cent. completed).
(b) Side lining (35 per cent. completed).
3. Concreting the sub-structure walls of Power House (60 per cent. completed).
4. Casting R.C.C. columns in the Super Structure (15 per cent. completed).

Canal Power Development

I. Works completed

1. A pipe under tunnel across the Power Canal.
2. (a) Exploration of soil in the Forebay Bund.
(b) Excavation for the bank connections at either end of the bund.
(c) Removal and re-erection of archæological monuments.
(d) Excavation for the puddle core trench in northern bund.
3. (a) Grading of I.P.P.L. and Penstocks.
(b) Excavation for foundations of surge tank.
4. (a) Excavation for the transformer yard.
(b) Construction of retaining walls and revetments.
5. Formation of approach road to Power House.
6. Construction of certain staff quarters and dispensary.
7. Provision of permanent water and electricity supply sewage system.
8. (a) Excavation for the surplus escape.
(b) Construction of a drop at L.S. 769.
9. (a) Excavating trench from L.S. 115 to 1261 in Forebay Bund.
(b) Masonry portion of the composite section from and L.S. 0-115.
10. Erecting workshop for the fabrication of L.P.P.L.
11. Formation of camp roads.
12. The approach road to Kamalapuram Tank Bed.

II. *Works in progress*

1. Formation of banks in the last reach of the Power Canal.
2. Excavation for the approach channel to intake (90 per cent. completed).
3. Excavation for the puddle core trench of southern bund of Forebay (L.S. 600 to 2740 is completed).
4. Excavation for Power House below R.L. 1416 (98 per cent. completed).
5. Excavation of Tail Race Channel.
6. Excavation for the Tail Race Pond (95 per cent. completed).
7. Work on the in-let drop has been started.

Transmission Lines

66 KV Lines

Works completed

1. 109 towers were erected between Dam Power House to Bellary Via Canal Power House.
2. Stringing between Canal Power House and Bellary. ...
3. Temporary division near Tungabhadra Dam Sub-Station.
4. Stringing between Dam Power House and Canal Power House completed.

Sub-Stations

Works completed

Construction of all staff quarters at Bellary Sub-Station.

Works in progress

1. Construction of Control House in Bellary Sub-Station.
2. Erection of O.C.B.'s and other structures.
3. Works in Transformer yard.