REPORT

1965-66

MINISTRY OF IRON AND STEEL

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13	last	3	88.000	88,000
14	1	8	expension	expansion
23	4	3	4.5	3.5
24	last	2	Indigenous	indigenous

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ORGANISATION

Consequent on the re-organisation of the Ministries in January, 1966 the Department of Iron and Steel hitherto part of the Ministry of Steel and Mines became a separate Ministry. The Ministry deals with the Iron & Steel (Control) Order, 1956, import and export of iron and steel, Steel Works in the public and private sector, steel re-rolling mills and ferro-alloys industry. Besides functioning as the administrative Ministry for the Hindustan Steel Limited, Bokaro Steel Limited, and the Hindustan Steel-works Construction Limited, it has also been entrusted with the work relating to the establishment of new Steel Plants in the Public Sector.

The Ministry has one attached office, namely, that of the Iron & Steel Controller with head office at Calcutta and three regional offices located at Bombay, Madras and Delhi. The Iron & Steel Controller is responsible for the administration of the Iron & Steel (Control) Order, 1956, issue of licences for the import/export of iron and steel and for the bulk purchase of steel. The Iron and Steel Controller also acts as Chairman of the Joint Plant Committee which has been constituted for the receipt and planned distribution of indents for supplies of steel from domestic production and the planning of rolling programmes on the main producers of steel in respect of controlled and decontrolled items of iron and steel. A monthly bulletin called "Iron and Steel Control Monthly Bulletin" is published by the Iron & Steel Controller. This gives detailed information regarding the production of iron and steel, import and export of steel, distribution of iron and steel and other details of interest to the traders and consumers of iron and steel. In May, 1965, Government set up a Study Team under the Chairmanship of Shri R. K. Khadilkar, M.P. to examine the working of the Iron & Steel Control Organisation and to suggest measures to streamline its functioning. The report of the Committee is expected by about the middle of 1966.

PRODUCTION

Production of iron and steel during 1965 was as under:—

1. *Production of Saleable Pig Iron*

(In tonnes)

Producer	1964	1965
TISCO	8,342	32,293
IISCO	213,519	217,922
Rourkela	73,253	73,517
Bhilai	371,787	452,051
Durgapur	416,243	321,303
Orissa Ind. Dev. Corpn.	34,147	32,634
Acme	8,058	4,111
TOTAL	1,125,349	1,133,831

2. (a) *Production of Finished Steel—Producer-wise*

Producer	1964	1965
TISCO	1,068,398	1,108,253
IISCO	648,849	618,688
Mysore	39,788	45,797
Rourkela	562,320	724,593
Bhilai	660,454	692,265
Durgapur	448,021	519,376
Secondary Producers	138,106	139,918
Regd. Re-rollers	555,663	443,560
Wire Drawing Units	99,121	113,166
Un-Regd. Re-rollers	121,310	122,542
TOTAL	4,343,017	4,528,718

2. (b) *Production of Finished Steel—Category-wise*

Heavy Structurals	173,557	203,086
Light & Med. Structurals	640,091	571,983
Heavy Rails	437,501	432,100
Light Rails	20,255	15,762
Black Sheets (P)	345,478	383,932
Galvd. Sheets (P)	28,920	25,954
Galvd. Sheets (C)	118,617	98,789
Plates	334,354	380,245
Bars	1,160,757	1,267,522
Rods	333,764	324,911
Wire Galvd.		
(*i*) Telegraph	185	597
(*ii*) Others	31,362	31,082
Wire Black	49,662	58,215
High Carbon	17,912	23,272
Hoops	10,888	11,934
Strips	129,293	220,388
Steel Sleepers	108,553	96,611
Tinplates	106,404	89,701
Skelp	193,455	198,322
W.T.A.	55,371	58,208
Special Section	46,638	36,704
TOTAL	4,343,017	4,528,718

2. (c) *Production of Electric Furnace Ingots:*

Main Producers	1964	1965
TISCO	17,069	17,224
Mysore	1,739	22,208
(i) TOTAL	18,808	39,432
Others		
Bhartia Electric Steel Ltd.	1,551	2,852
National Iron & Steel Co. Ltd.	15,606	15,918
Guest Keen Williams Ltd.	16,998	16,964
Mukand Iron & Steel Works Ltd.	6,903	6,932
Singh Engg. Works (P) Ltd.	6,838	6,860
J.K. Iron & Steel Co. Ltd.	10,293	9,289
Hindustan Iron & Steel Co..	5,789	7,901
Steel Rolling Mills of Hindustan (P) Ltd.?	4,492	1,847
(ii) TOTAL	68,470	68,563
GRAND TOTAL	87,278	107,995

AVAILABILITY AND DISTRIBUTION OF STEEL

Availability.—The total availability during 1965-66 is estimated at 5·6 million tonnes taking into account the indigenous production of 4·5 million tonnes and import of 1·1 million tonnes.

The availability of Pig Iron for 1965-66 is estimated at 1·2 million tonnes.

Distribution.—During the year under review the following steps have been taken in implementing the general policy of decontrol:—

(a) Control over price and distribution of pig iron (including ingot moulds and bottom plates), tinplates (including defectives), baling hoops (including defectives) and box strappings (including defectives) has been withdrawn.

(b) Control over distribution of hot rolled sheets and/or strips of 10-14 gauges has been withdrawn.

(c) Control over distribution of untested skelp and strips (mixed sizes) upto 312 mm. stands withdrawn till 31st December, 1966 only.

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IMPORTS AND EXPORTS

Imports.—Foreign exchange position in 1965-66 continued to be very tight. Due to conditions created by the currency, imports under Aid Credits became uncertain for a few months. Keeping in view the indigenous production, imports were restricted to essential items of steel. Imports were made under free exchange, barter deals, trade plans and U.S. Loans. Categories, quantities and value of imports are detailed below:—

Imports 1965-66 (upto December, 1965)

Category	Quantity in M/T	Value (in '000 Rs.)
Ingots	363	
Blooms, Billets, Slabs etc.	37,284	
Structurals	9,473	
Rails	476	
Railway Fittings	7,394	
Tinplate	25,827	
Sheets	251,847	
Plates	47,661	
Wire Rods	17,467	
Bars & Rods	64,499	
Pig Iron	47,203	
Hoops & Strips	25,808	
Wire	29,872	
Castings & Forgings	16,331	
Ferro-Alloys	1,724	
Tool & Alloy Steel	105,666	
Scraps	6,539	
TOTAL	695,434	

Exports.—Exports in 1965-66 were made in respect of the categories of steel which were surplus in the country. The quantity and value of exports during 1965-66 (upto December, 1965) are as below:—

Category	Quantity in M/T	Value (in '000 Rs.)
Ingots	1,126	
Blooms Billets & Slabs	1,075	
Finished Steel	97,173	
Ferro Alloys	44,530	
Scraps	325,628	
TOTAL	469,532	

During the year it was decided to canalise all imports through Minerals and Metals Trading Corporation (excluding imports under U.S. Aid).

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Imports 1965-66 (*upto December*, 1965)

Category	Quantity in M/T	Value (in '000 Rs.)
Ingots	363	463
Blooms, Billets, Slabs etc.	37,284	28,650
Structurals	9,473	7,982
Rails	476	590
Railway Fittings	7,394	9,993
Tinplate	25,827	27,466
Sheets	251,847	229,749
Plates	47,661	39,941
Wire Rods	17,467	15,367
Bars & Rods	64,499	58,655
Pig Iron	47,203	13,269
Hoops & Strips	25,808	31,457
Wire	29,872	34,709
Castings & Forgings	16,331	43,192
Ferro-Alloys	1,724	6,334
Tool & Alloy Steel	105,666	169,517
Scraps	6,539	4,326
TOTAL	695,434	721,639

Exports.—Exports in 1965-66 were made in respect of the categories of steel which were surplus in the country. The quantity and value of exports during 1965-66 (upto December, 1965) are as below :—

Category	Quantity in M/T	Value (in '000 Rs.)
Ingots	1,126	525
Blooms Billets & Slabs	1,075	519
Finished Steel	97,173	39,901
Ferro Alloys	44,530	29,619
Scraps	325,628	40,943
TOTAL	469,532	111,507

During the year it was decided to canalise all imports through Minerals and Metals Trading Corporation (excluding imports under U.S. Aid) of

black sheets (hot & Cold Rolled), galvanised sheets, skelp, hoops, strips and box strappings. Imports for Railways, against export promotion ceilings and under the AID Credits and certain licences issued by C.C.I. & E. for import of steel wire were exempted from canalisation.

PRICES

Due to excise duty and other charges various price circulars and other circulars have been issued from time to time during the period from 1st January, 1965 to 31st December, 1965. The change of prices/conditions of sale during the period is given below:—

1. Billets, defective or rejected upto 100 mm, were brought under the purview of control and a notification to that effect was published on 2nd January, 1965.
2. By notifications published on 9th January, 1965. All sales to controlled and Registered Stockholders by all Registered Producers including the main producers will be made at F.O.R. destination stations, 'freight paid' to stockholder's nearest Railway Station.
3. Introduction of I.S.I Certification Marks Scheme for steel with effect from 1st April, 1965 by Government notification published on 16th January, 1965.
4. Extra for Aluminium/Silicon killed steel fixed for Rs. 44·20 per M/Ton by notification published on 16th January, 1965.
5. As a result of the revision of the rates of excise duty from 1st March, 1965, the steel prices were reviewed with effect from 6th March, 1965.
6. Baling Hoops in coils have been deleted from Schedule IV & V by notification published on 25th March, 1965.
7. As a result of introduction of I.S.I. Scheme with effect from 1st April, 1965 the prices and general conditions were revised from 1st April, 1965. The steel prices were reviewed from 1st April, 1965. Old tested and untested were replaced by standard, commercial and off grade.
8. Tin Bars have been deleted from Schedule IV by notification published on 24th April, 1965.
9. By notification published on 22nd May, 1965 the amendment to para 4 of the conditions of sale of schedule No. IV prime quality steel and Semis has been made. In respect of item 2 of the price Schedule-Skelp, I.S.I. have not so far prescribed

any standard. The Standard prices in the price Schedule should apply to tested skelp supported by a test Certificate issued by Tatas Chief Metallurgist till such time as I.S.I. prescribes any standard for Skelp. Other terms and conditions remain unchanged.

10. Public Notice regarding introduction of I.S.I. Certificate Marks Scheme for steel. Producers were allowed to sell untested steel upto 30th September, 1965.

11. By notification published on 28th June, 1965 the amendment to the selling prices of Schedule No. IV prime quality steel and Semis has been made. Billet prices revised and size extras on Billets introduced.

12. By notification published on 19th July, 1965 the amendment to the selling prices of Schedule III Pig Iron has been made.

13. Substitution of 60/63/65 mm in place of the existing entry has been made by notification published on 31st July, 1965 (in case of Billets).

14. As a result of the revision of the rates of excise duty from 20-8-65 the steel prices were reviewed from 20-8-65.

HINDUSTAN STEEL LIMITED

During the year under review the activities of the Company consisted of the operation of the Steel Plants, the Coal Washeries at Dugdah, Bhojudih and Patherdih, the setting up of the Alloy Steels Plant at Durgapur, as well as the expansion of the 3 steel plants at Rourkela, Bhilai and Durgapur to 1·8, 2·5 and 1·6 million tonnes capacity respectively.

Organization.—The Bokaro Steel Project unit of Hindustan Steel Limited was wound up and the employees of the same were transferred to the Bokaro Steel Limited in April 1965. One more director was appointed to the Board of Directors with effect from April 8, 1965.

During the year under review further amounts were drawn from the Government towards the subscribed share capital of the Company. The same stood at Rs. 5,280 million as on 31st December, 1965. An amount of Rs. 430 million was drawn from the Government as loan for the period April to December, 1965. Total amount of loan drawn from the Government stood at Rs. 4001 million at the end of December, 1965. An amount of Rs. 178·55 million was paid as interest to Government for the year 1964-65.

ROURKELA STEEL PLANT

Production.—Production of steel was achieved to almost the rated capacity in Rourkela during the year under review. A very heartening

any standard. The Standard prices in the price Schedule should apply to levied items supported by a test Certificate issued by Tatas Steel Metallurgist till such time as I.S.I. prescribes any standard for Steels. Other terms and conditions remain unchanged.

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11. By notification published on 28th June, 1965 the amendment to the selling prices of Schedule IV prime quality steel and Semis has been made. Billet Prices revised and size extras on Billets introduced.

12. By notification published on 15th July, 1965 the amendment to the selling prices of Schedule III Pig Iron has been made.

13. Substitution of 60/63/65 mm in place of the existing entry has been made by notification published on 31st July, 1965 (in case of Billets).

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feature of the year's operation was the emergence of the plant to its expected stature. The details of production from April to December 1965 in the Plant are as follows:—

	(in '000 tonnes)
Coke (Dry)	914
Hot metal	800
Ingot Steel	800
Saleable steel	2
Semis	593
Finished Steel	

The proportion of the tested finished steel to the total saleable finished steel was 64% in Rourkela during 1964-65. The production in the Fertilizer Plant at Rourkela was less than the rated capacity during the period under review also. The technical committee appointed by the Government has submitted its report and has suggested the installation of a Naptha Reforming Plant to improve the working of the Plant. It has been agreed in principle to install the same and tenders on a limited basis have been invited from West German firms including the original suppliers. The tenders are expected to be opened on 31st March, 1966.

Sales.—Steps were taken during the year to reduce accumulation of stocks. In the absence of sufficient domestic orders for the specialised pipe plant at Rourkela, efforts were being made to book orders for the unit from foreign countries. The details of despatches and stock position for the period April to December, 1965 of the Rourkela plant are as follows:—

Despatches:—

	(in '000 tonnes)
Pig Iron	30
Steel Ingots	..
Rolled steel	586

Stocks :—

	(in '000 tonnes)			
	Pig Iron		Rolled steel	
	1-4-65	1-1-66	1-4-65	1-1-66
	13	32	50	56

Expansion.—The expansion to 1·8 million ton of steel ingot capacity is expected to be completed by the middle of 1967. Progress of work on

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	13	32	50	56

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some of the units suffered a set back due to unforeseen circumstances, like the offloading of job supplies by Pakistan at Karachi. It is however hoped that it will be possible to commission all the units by the ultimate target date. However, Sintering Plant was completed (in the beginning of February, 1965) and formally commissioned in Rourkela on 28th February, 1965.

During the 4th Plan period the capacity of the Plant is expected to be expanded further. A preliminary report on Rourkela expansion has been prepared by the Central Engineering & Design Bureau of Hindustan Steel Limited and has been submitted to the Government.

Mines & Quarries.—Production of Iron ore at Barsua mines declined and the mine worked to 46% of the rated capacity. Further the problem of fines and blue dust also continued during the period under review. Remedial actions are in hand. However, the production of lump ore was 71% of the target. To overcome the problem of fines and to improve the quality of ore a Beneficiation Plant is being set up. Supplies were drawn from the Minerals & Metals Trading Corporation and also from Kiriburu during the year under review. For the increased needs of Rourkela reliance will be placed on the planned expansion of Barsua and Kiriburu.

Mechanised production at the Purnapani Limestone Quarry started and it worked to 72% of the target. As usual, Satna met the requirements of Steel Melting Shop grade limestones and it worked to 102% of the target.

Township.—Due to need for economy in the present emergency, the proposal for additional houses is being reviewed to keep expenditure to the minimum. Out of 3000 more houses for Rourkela, only 860 houses whose construction had already started have been sanctioned. Proposals for the remaining houses are under consideration in consultation with the Finance Ministry.

Foreign Technicians.—The number of foreign technicians in the Plant for operation/maintenance at the end of 1964 and 1965 (upto November) was 95 and 66, respectively. The scheme to post Indian under-studies with a view to replacing foreign technicians has worked successfully, resulting in reduction in the number of foreign technicians posted in Rourkela. Another 60 foreign technicians who will mainly be required to look after the initial commissioning as well as maintenance of the expansion units that are scheduled for commissioning during the year, are expected to be in position. In Rourkela where the construction and erection work is done mainly through contractors, no foreign personnel have been directly employed by Hindustan Steel Limited for the work.

BHILAI STEEL PLANT

Production.—The details of production from April to December, 1965 in Bhilai Steel Plant are as follows:—

	(In '000 tonnes)
Coke (Dry)	1,238
Iron (Hot Metal)	1,182
Ingot Steel	978
Saleable Steel	
Semis	180
Finished steel	536

The proportion of the tested finished steel to the total saleable finished steel was 77% in the plant during 1964-65 as against 72% in 1963-64. During the year under review production of steel exceeded the rated capacity. The production of 146,689 tonnes of Hot metal in November, 1965 was a record for a month. Diversification of the range of products continued in order to meet the growing demands of the steel consumers and fabricators. In the merchant section and structural mills at Bhilai, several new sections were developed during the year under review. Special sections like ribbed bar, crane rails and sheets pilings sections are under current development.

Sales.—The despatches and stock position during the period April to December, 1965 were as under:—

(In '000 tonnes)

Item	*Despatches*
Pig Iron	362
Steel Ingots	..
Rolled Steel	719

	1-4-65	1-1-66
Stocks:		
Pig iron	9	19
Rolled Stock	49	40

Expansion.—The expansion of Bhilai Steel Plant from 1 mT to 2·5 mT progressed satisfactorily. The following units were commissioned on various dates shown below:—

1. Open Hearth Furnace No. 8	17-5-65
2. Colling beds in the Billet Mill	24-7-65
3. Re-heating furnace in the Merchant Mill	30-7-65
4. Compressor Nos. 1 & 2 in Compressor Station No. 2	July, 1965
5. Aggregate Crushing Plant in the Slag processing Plant	5-7-65

6. Turbo Generator Nos. 3 and 5 in the power and blowing station. December, 1964
7. Coke Oven Battery No. 5 6-12-65
8. 2nd Mixer 27-12-65
9. Open Hearth Furnace No. 9 12-1-66
10. Rail Finishing groups . . . . . October, 1965.

Due to certain delays which have occurred in the construction, fabrication and refractory work in India, the commissioning schedule for various units has had to be delayed by a few months in certain cases. The completion of the entire expansion scheme is now expected by the middle of 1966.

Expansion during the Fourth Plan.—The further expansion of the Plant beyond 2·5 million tonnes steel ingots within the Fourth Plan period is under consideration. The expansion of Bhilai Plant is envisaged in two phases during the Fourth Plan period. The first phase comprises coke and iron making facilities and the second phase comprises steel making and rolling facilities. A detailed Project Report on coke and iron making facilities for expansion was prepared by the Design Organisation of the Bhilai Steel Plant in early 1964 and was sent to the Soviet Design Organisation Gipromez on the 3rd August, 1965 for the supply of part of equipment and refractories required for the 6th Blast Furnace as well as technical assistance, such as designing works, delivery of equipment, deputation of Soviet Specialists and training of Indian specialists in U.S.S.R. The U.S.S.R. Government have agreed to provide these facilities under the Indo-Soviet Credit Agreement of February, 1961. A contract is also being finalised for the supply of equipment from the Heavy Engineering Corporation at Ranchi which is expected to supply nearly 43% of equipment and 65% of structurals. Certain sectional Project Reports are awaited from the Soviet side on the receipt of which the date of commissioning of the various units will be finalised. The iron making facilities are expected to be commissioned towards the end of 1967.

As regards phase II expansion regarding steel making and rolling facilities the preliminary reports prepared by the Design Cell of the Bhilai Steel Plant were discussed with the Team of the Russian Experts who visited India recently and it has been decided to undertake a further techno-economic study to consider the pattern of Bhilai Steel Plant expansion. After the study has been completed and discussed, the detailed Project Report will be prepared by the Design and Planning Department of the Bhilai Steel Plant. The Soviet Design Organisation will assist in the preparation of the Project Report to the extent required by the Bhilai Design Organsiation.

Mines and Quarries.—The entire iron ore requirements were met from the mine at Rajhara during the year under review. The Rajhara mine worked to 87·8% of the target.

The Nandini Limestone Quarry exceeded the target. Plans are in hand to develop the mines at Jharandhalli and to expand production at Rajhara to meet the additional requirements of iron ore required for 2·5 million tonnes expansion.

Foreign Technicians.—The number of foreign technicians for operation/maintenance in the Plant at the end of 1965 (November) was 54 as against 21 at the end of 1964. The increase in the number of foreign technicians is on account of necessity to have them for the work relating to the initial commissioning and running of the various new units coming up under the expansion programme.

In addition, 282 foreign technicians were in employment on the Design and Construction side at the end of November, 1965. The corresponding figure for the previous year was 300.

DURGAPUR STEEL PLANT

Production.—The production of steel was achieved to almost the rated capacity in Durgapur during the year under review. The performance during the period April to December 1965 in the plant is as under:—

(In '000 tonnes)

Coke (Dry)	1024
Hot metal	962
Ingot Steel	759
Saleable steel	
Semis	106
Finished steel	392

The proportion of the tested finished steel to the total saleable finished steel was 73% in Durgapur during 1964-65.

Diversification of the range of products continued in order to meet the growing demands of the steel consumers and fabricators, in the merchant section and structural mills at Durgapur. Several new sections were developed during the year under review.

Sales.—Steps were taken during the year to reduce accumulation of stocks. The details of despatches and stock position for the period April to December 1965 of the Plant are as follows:—

(in '000 tonnes)

Despatches:—	
Pig iron	251
Steel Ingots	5·6
Rolled steel	569

Stocks:—	Pig Iron		Rolled steel	
	1-4-65	1-1-66	1-4-65	1-1-66
	5	3	62	65

Expansion.—The 4th Blast Furnace is expected to be ready by the end of March, 1966, when the Blast Furnace No. 1 will be taken for relining.

During the 4th Plan period the capacity of the plant is expected to be expanded further to 3·4 million tonnes. The Project Report for Durgapur expansion and preliminary report on the expansion on steel making have been prepared and are under examination.

Mines & Quarries.—As in the previous year all the requirements of the Iron ore and other raw materials were met from market sources—iron ore from Bolani Ores Ltd. and other materials from the Minerals & Metals Trading Corporation etc.

Township.—Due to the need for economy in the recent emergency proposals for additional houses are being re-examined in order to keep expenditure to the minimum.

Foreign Technicians.—The number of foreign personnel for operation/maintenance in the Plant at the end of 1964 and 1965 (upto December) was 42 and 25 respectively. 30 foreign technicians are expected to be in position during the current year. They will be mainly required to look after the initial commissioning as well as maintenance of the expansion units which are scheduled for commissioning during the year. The construction and erection work is done mainly through contractors in Durgapur, and no foreign personnel have been directly employed for this work. However the services of 4 British technicians have been secured under the Colombo Plan for general and overall supervision of construction work also.

BOLANI ORES LIMITED

For the development and operation of the mines in the Gua region of Orissa for supply of iron ore for Durgapur Steel Plant, a company named Bolani Ores was set up by the Government of India in collaboration with the Orissa Mineral Development Company. The present share capital of the Company is Rs. 10 million. Of this, the Government of India hold 50·5 per cent, while the remaining shares are held by the Orissa Mineral Development Company.

The first phase of mining has already been completed and the Company is currently producing 2 million tons of Iron ore per year. The supply of ore to Durgapur Steel Plant started in April, 1960.

Bolani Ores Limited have a scheme to expand their iron ore production to 3 million tonnes so as to meet the increased requirements of Durgapur Steel Plant when they reach a production capacity of 1·6 million ingot tonnes. The cost of expansion is estimated at Rs. 55·29 million including a foreign exchange element of Rs. 23·8 million. An application furnished by the Company to USAID authority for a foreign exchange loan to finance the foreign exchange cost of the scheme is still under their consideration.

Most of the iron ore requirement of Durgapur Steel Plant is met from Bolani Ores, the balance being bought out from the M.M.T.C. With the Iron making units included in the 1·6 million tonnes expansion going into production, Durgapur's requirements of iron ore would go up during 1966-67-68. Till Bolani Ores Limited are in a position to meet this increased requirement from their expanded output, Durgapur Steel Plant would be obtaining its increased requirement from M.M.T.C.

ALLOY STEELS PROJECT

The development and sales of Special Steels which was augmented after the present emergency, has made substantial improvements in savings for the country in foreign exchange, particularly in the defence sector. The production of special steels during 1964-65 was 82,981 tonnes. It is hoped that significant contribution will further be made in this direction as and when the units of Alloy Steel Project are commissioned. A total quantity of 8200 M/T of special steel ingots was produced upto December, 1965 in Steel Melting Shop No. II of Alloy Steels Project, which was commissioned in January, 1965. A Hammers Bay of the Forge Shop was commissioned in December 1965. It is expected that by August 1967 all the units of the Project will be ready.

During the 4th Plan period the capacity of the Alloy Steel Project is expected to be expanded to 300,000 tonnes.

The total domestic demand at the end of the Fourth Plan is estimated at 500,000 tonnes per annum. To achieve this production, a capacity larger than the demand is proposed to be licensed, as it takes a long time for an Alloy Steel scheme to be implemented. A capacity of about 570,000 tonnes has already been licensed—137,000 tonnes of which is in the public sector.

Ferro-alloys form an important raw material for the production of alloy steels. Steps have been taken to create indigenous capacity for their production, wherever possible.

CENTRAL TRANSPORT & SHIPPING OFFICE

Shipping and Transport office of Hindustan Steel at Calcutta continued to do departmental clearance and forwarding of equipments for the expansion projects as well as for exports. They handled about 88,000 tonnes of imports and about 40,000 tonnes of export materials during 64-65.

CENTRAL ENGINEERING & DESIGN BUREAU

The Central Engineering & Design Bureau at Ranchi continued on its main task as consultants for the expansions at Durgapur and Rourkela. As mentioned earlier, they have prepared detailed Project Reports for the 4th Plan expansion of Durgapur to 3·4 million tonnes capacity during the year under review. The same has been submitted to the Government and will be the basis of negotiations with the British Government and suppliers. The Central Engineering & Design Bureau have just concluded preparation of a preliminary project report for the expension of Rourkela Steel Plant during the 4th plan period. They are also examining progress of optimum expansion of the Hindustan Steel Limited plants in the future plan periods. They have also prepared Project Reports on specific problems like improvement to the Coke Ovens Unit at Rourkela with a view to ensure supply of gas to the fertiliser plants. The present strength of Central Engineering & Design Bureau is 497 consisting of 167 engineers and other staff.

RECRUITMENT

The number of persons recruited to the following categories during 1965 is as below:—

Category	Number
Graduate Engineers	370
Operatives/Artisan etc.	587
Apprentice Accountants	28

The above number covers the persons recruited to all the units of the Company. Out of the 370 Graduate Engineers recruited, 50 are meant for Bokaro Steel Limited. A large number of Graduate Engineers had to be recruited in 1965 to meet the requirements of expansion.

Mention has been made of the scheme of in-plant training of student engineers in the steel plants in the last years' report. 113 of the 160 student engineers who were recruited during 1964 underwent the second phase of their training in the steel plants during the summer vacation of 1965. Out of these, scholarships have been offered to and accepted by 40 student engineers and they are pursuing their final year of degree course and after that they would join Hindustan Steel Limited as Graduate Engineers. During this year a further batch of 224 student engineers were selected for the scheme and they underwent the first phase of training during the summer vacation.

TRAINING

The total number of trainees on the rolls of technical institutes in the Plants on 31st December, 1965 was as follows:—

Plant	Appren-tice trainees	Other trainees	Graduate Engineers	Trainees from A.S.P.	Trainees from other under-takings	Total
Bhilai . . .	243	662	157	13	9	1084
Durgapur . .	179	94	161	50	3	484
Rourkela . .	314	441	163	03	30	1011

The Technical Institutes in the Plants, in addition to the regular training courses meant for various categories of direct recruits, also conducted several short term training courses for experienced workers and supervisory personnel.

The Management Training Institute of the Company located at Ranchi conducted 17 programmes upto 31-12-1965 for Junior, Middle and Senior management personnel. A total of 371 management personnel participated in these training programmes.

Upto 31-12-1965 the number of personnel sent abroad for training for the various units of the Company is as follows :—

Bhilai	45
Rourkela	51
Alloy Steels	20

For the year 1966-67 negotiations are under way to secure training facilities for a total number of 74 personnel belonging to the 3 steel plants and the Alloy Steel Plant of the Company.

INCENTIVE BONUS

The approved production incentive scheme continued to be operated in Rourkela and Durgapur during the year under review. It has not yet been introduced in Bhilai, which is operating on the carlier Scheme. The incentive scheme for Rajhara mine and Nandini mechanised mines was revised. Decisions were also taken regarding the applicability of the bonus ordinance/Act and the period from which bonus has to be paid under the same.

INDUSTRIAL RELATIONS

Industrial relations in all the plants during the year under review were quite satisfactory.

As has been mentioned in the last year's report, the Company assisted the Expert Committee set up by the Central Wage Board for the Iron and Steel Industry in regard to their studying the wage differentials in the entire steel industry. The award of the Wage Board was accepted by the Government for implementation, during the year under review. Accordingly the Company held discussions with the representatives of the three steel plants unions jointly at the Head Office and concluded two agreements, one relating to employees engaged in the steel plants and the other relating to the employees engaged in construction activities, to give effect to the various recommendations contained in the Wage Board's award as accepted and modified by the Government. The new wage rules came into effect in Hindustan Steel Limited as a result of this agreement with effect from 1-4-1965.

Medical and other welfare facilities were continued to be provided on a liberal scale in the three steel plants. Plans have been finalised for providing departmental transport in Rourkela to the steel plant employees consequent upon the decision of the Orissa State Transport authorities to discontinue the transport facilities which they are now providing.

FINANCIAL RESULTS

For the first time since its inception the Company was able to get a net surplus of Rs. 21·45 millions. The net surplus of the various units, after deducting all expenditure and making provision for various necessary items, is as under :—

Rourkela	8·73 million	(35·02 million *less* loss of Fertiliser unit of 26·29million).
Bhilai	5·03 ,,	
Durgapur	5·33 ,,	
Coal Washeries	2·36 ,,	

The net surplus for the Company as a whole would have been higher but for the loss incurred by the Fertiliser Plant at Rourkela, which amounted to Rs. 26·29 million. However, the cumulative loss from the inception of the Company till 31-3-1965 stood at Rs. 774 million, because of the necessity to make various adjustments for prior period, chiefly on account of the provision for depreciation for 3rd shift working, which alone amounted

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to Rs. 84·343 million. Considering the various limitations imposed on the working of the plants, such as ageing of some of the blast furnaces, parallel activity going on account of expansion, a large increase in the wage bill on account of the Wage Board award, increase in interest rate, excise duties and prices of raw materials, the net surplus earned by the Company is an encouraging achievement.

COAL WASHERIES

The availability of good quality coking coal in the country being limited, it is necessary to conserve existing resources and improve upon the quality of the coal available to make it fit for use at the Steel Plants. This is sought to be achieved by :—

(i) washing available metallurgical coals to reduce the ash content in them;

(ii) making increasing use of weak or semi-coking coal in blends with the good coking coal.

Hindustan Steel Limited operate four washeries at Durgapur, Dugda, Bhojudih and Patherdih. These washeries are in addition to the washeries in the private sector and the public sector washery at Kargali, operated by the National Coal Development Corporation.

The Durgapur Washery which was commissioned in April, 1960 is a part of the Durgapur Steel Plant and supplies washed coal only to this plant. The washery produced ·59 million tonnes of washed coal between April to December, 1965.

The washery at Dugda is located in the Hazaribagh district in Bihar and has been in operation since December, 1961. The Washery is designed for an annual input capacity of 2·4 million tonnes of raw coal. The washery operated at a reduced output for a short period because of several reasons, such as the shortage of spares, interruption due to constructional activity, and transport difficulties etc. but the position has improved considerably. The washery is currently running at 85% to 90% of capacity and output of washed coal from April to December, 1965 was 0·75 million tonnes.

Bhojudih Washery is situated in Purulia district in West Bengal. The first stage of the Washery which has an annual input capacity of 1·2 million tonnes of raw coal was completed in October, 1962. The expansion of the washery raising the annual input capacity to 2·0 million tonnes of raw coal was completed in October, 1963 and the integrated unit has been in operation since then. During the period April to December, 1965 the washery produced 0·99 million tonnes of washed coal for supply to Tata Iron & Steel Co. and the Rourkela Steel Plant.

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Patherdih Washery is located in the Dhanbad district in Bihar. The Washery has been designed for a capacity of 2·0 million tonnes of raw coal per annum. The washery underwent trial run in November, 1964. Due to certain unavoidable reasons, production of washed coal during 1965 has been restricted to 0·21 million tonnes. The guarantee tests are expected to be completed soon and the Washery will then go into commercial operation.

To meet the requirements of the expanding steel industry, a second coal washing plant with an annual input capacity of 2·4 million tonnes of raw coal is being set up at Dugda. The plant is expected to be ready by the end of the 3rd quarter of 1966 and is likely to go into commercial operation by the beginning of 1967.

BOKARO STEEL PROJECT

In accordance with the Indo-USSR Agreement dated the 25th January, 1965, and the Contract dated the 6th February, 1965 between Messrs Tjazhpromexport and Bokaro Steel Limited for design work connected with the Bokaro Steel Plant, the Soviet organization submitted a Detailed Project Report in December, 1965. This Report has been considered by a high level Technical Committee consisting of specialists from the both public and private sectors. The Committee's recommendations were considered by the Board of Directors of Bokaro Steel Limited on the 9th February, 1966. The Bokaro Steel Ltd. have accepted the Russian Detailed Project Report subject to modifications mutually agreed to by both the sides.

The detailed Project Report provides for establishment of a plant with a capacity of 4 million tonnes steel ingots per annum, the first stage being 1·7 million tonnes. Modern production processess are to be used for the production of iron and steel. The Detailed Project Report also provides for the construction of metallurgical, power and other units—2000 cu.m. blast furnaces, 252 sq.m. area sintering bands, 100 and 250 tonnes converters, 1250 mm slabbing mill, hot and cold strip mills, continuous pickling, galvanizing and shearing lines etc. For the 4 million tonnes stage, the estimated cost as given in this Report is Rs. 770 crores including equipment costing Rs. 322 crores.

The contract for the supply of plant and machinery from the U.S.S.R. is expected to be concluded by the middle of 1966. Actual construction and erection work is, therefore, expected to commence towards the second half of 1966 and the first stage is likely to be commissioned by 1970-71.

About 13,300 acres of land have been acquired against an estimated requirement of 36,830 acres. Site preparation work involving 13·4 million cubic metres of earthwork, is being attended to by Hindustan

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Steelworks Construction Limited, a public sector undertaking. The work is estimated to cost Rs. 93·59 million and is to be completed in 12 months. 24% of the work has been completed so far. The construction of a Construction Yard is also to be taken up by the Hindustan Steelworks Construction Limited at a cost of about Rs. 7 million.

The requirements for water for construction and for the township are to be met from Garga Dam which is being built at a cost of Rs. 8 million. The dam is scheduled to be completed by December, 1966. The Tenughat Dam which will meet the requirements of the Plant proper is being constructed by the Government of Bihar with loan assistance from the Government of India. The Tenughat Dam is expected to be commissioned in 1969-70.

The Bokaro Steel Plant will draw iron ore from the Kiriburu and Meghahataburu Iron Ore Mines. Kiriburu is to be expanded and the adjacent mine at Meghahataburu developed to meet the requirements of the 4 million tonne stage. The Plant will draw flux-grade limestone from Bhavanathpur and steel-making grade limestone from Kuteshwar.

Apart from 600 temporary houses and 500 labour hutments constructed earlier, the construction of 992 permanent houses was completed during the year. A temporary hospital with 50 beds was also set up during the year. The construction of 200 roomed hotel to provide accommodation for Soviet specialists was taken up in May, 1965, and is likely to be completed towards the end of 1966.

There were 1,241 persons in position at the Bokaro Steel Limited as on 31st December, 1965. Besides, 8 Junior Officers (Non-Technical), 3 Graduate Apprentices, 159 Student Engineers, 176 Displaced trainees, i.e., 346 Trainees are being trained for absorption in the Company.

HINDUSTAN STEELWORKS CONSTRUCTION COMPANY LIMITED

The Hindustan Steelworks Construction Company has been set up under the administrative control of the Ministry of Iron and Steel with the object of taking up the construction of steelworks and allied facilities to be set up in the future. The authorised capital of the Company is Rs. 1 crore.

The Company has been awarded the following work in connection with the Bokaro Steel Project :—

(a) Site-levelling work involving 13·4 million cubic meters of earthwork at an estimated cost of Rs. 93·59 million to be completed within 12 months commencing from the 1st October, 1965.

(b) Work in connection with the setting up of a Construction Yard for the Structural Fabrication Shop at Bokaro at an estimated cost of Rs. * million.

(c) Work relating to the provision of temporary rail facilities at Bokaro at an estimated cost of Rs. 4·7 million.

MYSORE IRON AND STEEL LIMITED

Mild Steel expansion.—All the units of the expansion Project, which are expected to increase the capacity of the steel production to one lakh tonnes have been commissioned. The teething troubles are being overcome and it is expected that the full capacity will be reached during the year 1966-67.

Alloy & special steels scheme.—It has been decided to convert the production facilities at MISL for production of Alloy and Special Steels. Orders for major portion of plant and equipment have been placed. The conversion is likely to be completed by 1968. When complete, MISL will produce 106,000 tonnes of alloy steel ingots to be finished into 77,000 tonnes of finished products.

Foreign exchange for import of plant and equipment has been provided by the West German Government through a direct loan to MISL. M/s. G. Bohler & Co. of Austria have been appointed as Technical Collaborators. They will provide technical assistance and technical know-how for manufacture of alloy and tool steels.

Pending completion of this conversion scheme, MISL are also studying the possibility of starting some special steel production with the equipment as installed.

Expansion of Pig Iron Capacity.—To correct the iron imbalance that would arise after the alloy steel production gets under way, Government have approved a substantial expansion scheme raising the pig iron capacity by about 120,000 tonnes per annum. The foreign exchange cost of the scheme is being met from a direct loan agreement entered into with K.F.W. of West Germany.

STEEL INDUSTRY IN PRIVATE SECTOR

Tata Iron and Steel Company Limited.—The Company has already achieved the rated production of 1·5 million tonnes of saleable steel. Their proposals to import certain balancing equipments and facilities to enable them to maintain this rated production was earlier considered and

approved by the Government. HSCO had been allowed to negotiate a World Bank Loan to meet the foreign exchange cost of these schemes. The loan is yet to be negotiated.

Indian Iron and Steel Company Limited.—The Indian Iron and Steel Co. Limited had submitted proposals for steel expansion aimed at increasing the production of steel ingots from 1 million tonnes to 1·3 million ingot tonnes per annum in the first phase. The scheme has been approved by Government. The Indian Iron and Steel Company have been permitted to approach the World Bank for arranging a loan to cover the foreign exchange cost.

Rerolling Industry.—The requirements of steel rerolled sections at the end of the Third Plan have been estimated at about two million tonnes. Keeping in view the capacity which is already in existence, the scope for creation of further capacity was limited. The restricted availability of billets was another limiting factor. Taking these factors into account a capacity of about 150,000 tonnes was sanctioned during 1961-62 in regions which were underserved. The greater part of this capacity has now been commissioned. Owing to a continued shortage of billets, the policy of generally restricting growth of fresh re-rolling capacity has been continued.

The capacity of the rerolling units and their billet-entitlements have been subjects of considerable controversy. In April, 1965, the Government appointed a Technical Committee under the Chairmanship of Shri S. C. Mukherjee, Deputy Iron and Steel Controller, to make a rational assessment of the capacity of rerolling mills. The Committee will—

(a) assess the capacity of rerolling mills whether working on billets or scrap;

(b) recommend what types of merchant products the rerolling mills can roll economically; and

(c) indicate what units are out-dated and/or uneconomic.

The report of the Committee has not so far been received.

Ingots/Billets.—There are twelve units at present for the manufacture of steel ingots/billets with an annual capacity of approx. 85,000 tonnes. Actual production is however, of the order of 60,000 tonnes. A further capacity of about 80,000 tonnes is under implementation. Besides, three schemes for setting up concast units (including Madras Government's

Arkonam Project for a 100,000 tonnes annual capacity) with a total capacity of 230,000 tonnes have also been sanctioned. Thus, a capacity of almost 400,000 tonnes has already been planned. This capacity, when set up, will augment the supplies of billets to the rerolling industry.

An Inter-Ministerial Committee was constituted under the Chairmanship of Shri R. V. Raman, Joint Secretary, to examine the question of licensing of additional capacity for steel ingots/billets outside the main steel plants during the Fourth Plan and make suitable recommendations on the electric furnace capacity that should be created. The findings of this Committee cast some doubts on the availability of scrap during the Fourth Plan period. Against this background and also taking into account capacity which has already been sanctioned and also the anticipated production of the Main Steel Plants, it has been felt that for the present there may not be a great deal of scope for licensing fresh capacity on a large scale.

Pig Iron.—In order to bridge the gap between demand and supply of foundry grade pig iron, Government have approved so far a total capacity of 2·40 million tonnes mostly in the private sector. Some of the earlier licenses have not fructified yet. Since some of the other applicants have been granted letters of intent comparatively recently, it is expected that the bulk of the capacity will be created only during the Fourth Plan period.

Wire.—A total capacity of 3,02,782 tonnes was licensed under the Industries Act for the manufacture of wires of all types. Out of this, capacity of 14,076 tonnes has been revoked as these units did not register satisfactory progress. The effective licensed capacity is therefore, 2,88,706 tonnes of which about 2,27,106 tonnes have been installed. This will meet the requirements of mild steel wire as well as special wires like tyre-bead, electrode-core type, alloy steel and special quality wires.

Besides these, there are also units which do not attract the provisions of the Industries Act, which stand sanctioned under the Steel (Control) Order. These are medium sized units.

Consequent upon the relaxation of the provisions of the Steel (Control) Order in April, 1960, small wire-drawing units can be set up from indigenously secured plant and raw materials without any permission from the Iron and Steel Controller.

Tinplates.—The demand for tinplates by the end of the Third Plan and the Fourth Plan has been estimated at 2,61,000 tonnes and 5,24,000 tonnes per annum respectively.

The capacity booked so far is 4,50,000 tonnes of which 1,40,000 tonnes has been commissioned. An additional capacity of 60,000 tonnes has also been installed.

In addition to the capacity of 4,50,000 tonnes booked so far, a second 1,50,000 tonnes electrolytic line at Rourkela Steel Plant is proposed to be set up during the Fourth Plan. Therefore, in all, a capacity of 6,00,000 tonnes per annum would be set up in the private and the public sectors by the end of the Fourth Plan.

FUTURE DEVELOPMENT

The targets proposed for the iron and steel development programme for the Fourth Five Year Plan were 16·5 million tonnes of steel ingots to be rolled into finished steel; 4·5 million tonnes of foundry grade pig iron; and 0·5 million tonnes of rolled tool, alloy and special steels. These targets are now under review.

To achieve the capacity target for steel, it was proposed to expand the existing steel plants to their maximum economic limit and to set up a new integrated steel plant besides Bokaro. The new steelworks was to be the 5th steel plant in the public sector. A report on the feasibility of setting up this plant in the Goa-Hospet, Neyveli-Salem and Bailadila-Visakhapatnam regions was obtained from the British-American Steelworks for India Consortium. The report has been under consideration of the Government for sometime. The expansion programme of the existing steelworks is also under consideration.

The target for pig iron production is proposed to be achieved by increased production from the schemes licensed in the private sector and the integrated steelworks. Possibilities of improved preparation of raw materials and introduction of technical improvements to increase production from the blast furnaces is also being studied. If necessary, more blast furnace complexes may also be set up in the public sector.

The capacity for production of tool alloy and special steel by the end of the Third Plan period is expected to be 334,400 tonnes. It is considered that in Alloy Steel, a production target of 500,000 tonnes would require a total capacity of 550,000 tonnes to be created. It would thus be necessary to create an additional capacity of 215,600 tonnes in the Fourth

Plan Period. The possibilities of expansion of the Alloy and Special Steel Project, Durgapur and licensing additional capacity in the private sector are being studied in this connection.

It is proposed to meet the requirements for Plants and equipment from Indigenous sources to the maximum extent possible. Studies have been initiated to plan production of plants, machinery and spares required for the construction and operation of the steel plants in the country to attain self-sufficiency in this regard.

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Report
1965-66

GOVERNMENT OF INDIA
MINISTRY OF IRRIGATION
AND POWER
NEW DELHI

ANNUAL REPORT

1965-66

MINISTRY OF IRRIGATION AND POWER

GOVERNMENT OF INDIA

1966

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MINISTRY OF IRRIGATION AND POWER

EVENTS OF THE YEAR 1965-66

A RESUME

The biggest challenge facing the country today is on the food front where there is considerable shortfall between the demand and actual output. To wipe out the food deficit and attain self-sufficiency to meet the growing requirements, the highest priority has been accorded in the Fourth Plan for agricultural programmes.

2. Assured irrigation is one of the basic inputs for agricultural production. It is also an essential pre-requisite for multiple cropping and intensive use of land. In order to realise early benefits from major and medium irrigation projects, it has been decided to expedite completion of all those projects which are in an advanced stage of construction.

3. 1965-66 was an exceptionally dry year. The rains failed in most parts of the country, resulting in little flow in the rivers. Consequently, the level of water in most of the reservoirs is abnormally low, thereby seriously affecting the prospects for irrigation and hydroelectric generation. Flood damage in the year 1965-66 was relatively small as compared to previous years.

4. A review was conducted in 1964-65 in regard to the attainment of Third Plan targets in the irrigation and power sector and it was felt that it would be possible to attain the following targets by the end of the Third Plan :

(i) From major and medium irrigation projects, the benefits to be realised by the end of the Third Plan would be about 19.6 million acres (8.0 million hectares); and

(ii) The total installed capacity of power plants would go up to 11.0 million kW at the end of the Third Plan.

As against these revised targets, the actual achievements are likely to be the creation of only 18.1 million acres (7.3 million hectares) of irrigation potential and attainment of an installed capacity of about 10.5 million kW.

5. A critical review has been made of the reasons for the shortfall in the attainment of plan targets and it has been found that these shortfalls are mainly due to the scarcity of foreign exchange, short supply of key materials like steel and cement and increase in the estimated cost of projects, as also the tight financial position of the State Governments. The present indications are that with an outlay of Rs. 810 crores proposed for the Fourth Plan, it would be possible to create an additional irrigation potential of 13 milion acres (5.26 million hectares) during the Fourth Plan period.

6. A careful study has been made of the possibilities of rapid extension of irrigation facilities and efforts are being concentrated on speedily completing a number of major and medium projects, if necessary by providing additional funds. The other measures contemplated are energising as large a number of pumping sets as possible, and the speedy execution of an emergent programme of lift irrigation. Particular emphasis is being laid

on multiple-cropping and full utilization of regulated discharges from some of the major hydroelectric projects. Additional Central assistance to the extent of Rs. 15.5 crores was given to State Governments during the year for accelerating the construction work on some projects with a view to realising irrigation benefits quickly. The Chairman and Members of the C.W. & P.C. visited various States during the year and recommended detailed steps to be taken by the State Governments to implement this programme which will result in developing irrigation facilities for nearly 0.60 million hectares.

7. A Reviewing Committee was set up in 1965-66 to review the progress of execution of some selected irrigation projects with a view to removing bottlenecks. The progress of implementation of 13 major projects was reviewed by this Committee and realistic targets of benefits likely to be achieved were fixed. A similar Committee has been set up for reviewing the progress of works on power projects. Both these Committees met frequently to consider steps for realisation of early benefits from projects where works are in an advanced stage.

8. The report of the Third Annual Electric Power Survey Committee, giving an appraisal of the likely power demand and power availability in the country up to 1968-69, was finalized in May, 1965. Work on the Fourth Annual Survey has been initiated.

9. Up to the end of the Second Plan, 27,000 villages had been electrified. A target of electrifying 20,000 additional villages was fixed for the Third Plan. This target will not only be achieved, but considerably exceeded. 19,000 additional villages had been electrified up to March 1965 and another 8,800 are expected to be electrified during 1965-66.

10. Additional Central loan assistance to States was provided in 1965-66 to the extent of Rs. 881 lakhs for extending power supply to rural areas for agricultural pumping. It has been decided that priority should be given to villages with clusters of irrigation wells. In order to step-up the pace of rural electrification, a proposal is under consideration to liberalise the terms of financial assistance. The Government of India have also agreed to provide subsidy, for a period of three years in the first instance, on electricity rates for agricultural purposes in excess of 12 paise per unit, to be shared by the Centre and the States on fifty-fifty basis.

11. Certain anomalies and difficulties experienced in the working of the Electricity (Supply) Act, 1948, are sought to be removed by the Electricity (Supply) Amendment Bill which was introduced in the Lok Sabha in November, 1965. The Bill also seeks to facilitate raising of capital required for development and tighten control over financial operations of private licencees.

12. In addition to the Southern and Western Regional Electricity Boards, which were established earlier, the remaining three Boards, namely the Northern, the Eastern, and the North-Eastern Boards, started functioning during the current year. It is hoped that these Boards will help in developing the regional grids expeditiously and prepare the ground for evolving an all-India grid.

13. Among the important projects completed and commissioned during the year, were the first stage of the Sharavathy Hydroelectric Project (first unit of 89.1 MW was commissioned in January, 1965 and the second unit in June 1965); the 140 MW second unit of the Chandrapura Thermal Power Station under the Damodar Valley Corporation; the 150 MW unit of

Trombay Thermal Station, Tata Hydro-electric Agencies Ltd., and Kosi Barrage.

14. Flood control, drainage, anti-waterlogging and anti-sea erosion problems continued to receive close attention. A Beach Erosion Board has been set up to tackle sea-erosion in Kerala on a scientific basis.

15. The Central Water & Power Research Station, Poona, which is the premier organisation in the country for hydraulic and allied engineering research, celebrated its Gold Jubilee in January, 1966. During the fifty years of its existence, the Research Station has been rendering valuable service to the various Central and State Departments in preparing designs of works for flood control, river training, irrigation and power projects, bridges, ports, harbours, ships, etc.

16. The services of some foreign experts have been made available to the Central Water and Power Commission from time to time under various aid programmes, like U.S. Agency for International Development, U.N. Special Fund and U.N. Expanded Programme for Technical Assistance. They were engaged on programmes for training in operation and maintenance of heavy earthmoving equipment and utilisation thereof, survey of sites for potential hydroelectric projects, design and investigation of river valley projects, design of high earth dams and rockfill dams, etc. Eleven such experts are at present working in the Central Water and Power Commission.

In addition, during the year under report, the services of five specialists have been obtained from U.S.S.R. for a period of three years to develop the Tharmal Designs Organisation of the Central Water & Power Commission. The services of two more Soviet specialists have also been obtained for preparing a scheme report for setting up an institute at Neyveli for training operation and maintenance personnel for large thermal power stations.

17. The Sixth Plenary Session of the International Commission on Irrigation and Drainage was held in India in January 1966. It was attended by representatives from 34 countries and provided an excellent opportunity for exchange of ideas on irrigation, drainage and flood control. A number of papers were presented and detailed discussions were held on (i) Reclamation of saline lands under irrigation, (ii) Sediment in irrigation and drainage channels, (iii) Development of deltaic areas, and (iv) Integrated operation of reservoirs for irrigation, flood control and other purposes. These discussions were of special interest to India at this juncture, in view of the concerted efforts that are being made for achieving self-sufficiency in food production by optimum economic development of the water resources in the country.

18. A conference of State Ministers of Irrigation and Power was held in November 1965. Among the subjects discussed were acceleration of execution of those irrigation and power projects which were in an advanced stage of construction so that maximum benefits could be derived during the next two or three years; multiple-cropping; measures to speed up rural electrification especially for energising pumps; targets for power generation in the Fourth Plan; establishment of a Central Equipment Pool; Betterment levy; constitution of the Indian Service of Engineers (Irrigation and Power Branches); etc.

19. Also, in November, 1965, a conference of Chairmen of State Electricity Boards was held when matters relating to the rural electrification programme in the Fourth Plan, terms and conditions for supply of electricity

to agricultural consumers, formation of rural electricity co-operatives, incentives for use of electricity in agricultural production, rate of electricity for agriculture, inter-State sale of electricity, amendment of legislation on electricity, etc. were discussed.

20. The Committee, set up in September 1964, under the Chairmanship of Dr. A. N. Khosla, to evolve the best possible Master Plan for the utilisation of the Narmada waters, submitted its report in September 1965. The report was forwarded to the Government of Madhya Pradesh, Gujarat, Maharashtra and Rajasthan for their comments. Comments of the Governments of Madhya Pradesh, Gujarat and Rajasthan have been received.

21. The power development problems in the Southern and Northern regions were discussed at two separate conferences of Ministers incharge of Electricity and Chairmen and Chief Engineers of State Electricity Boards held in July 1965.

22. The 38th Annual Session of the Central Board of Irrigation and Power was held in November, 1965 when two important symposia were organised, one on "measures to accelerate food production in the country" and the other on "indigenous manufacture of power generating equipment in India."

23. The financial aspects of the reorganisation of the Damodar Valley Corporation on a functional basis are under consideration.

24. The National Projects Construction Corporation executed works costing Rs. 6.58 crores during 1964-65 and earned a profit of Rs. 52.81 lakhs which was the highest earned in any one year so far.

25. Among the subjects which were examined in detail by the Ministry of Irrigation and Power to minimise expenditure involving foreign exchange were : (i) Indigenous designing of Thermal Power Stations and manufacture of power plants and equipment, (ii) Indigenous production of high-head gates for irrigation and multipurpose projects, and (iii) Provision of training facilities for operation and maintenance personnel of large Thermal Stations.

CHAPTER I

SECRETARIAT OF THE MINISTRY

1.1 Functions

The Ministry of Irrigation and Power, established as a separate entity in 1952, is responsible for laying down the national policy for the conservation, development and regulation of the country's water and power resources and for the formulation and promotion of the national programme in the field of irrigation, power and flood control.

1.2 Administrative Matters

The strength of the Secretariat (including the Indus Waters and Ganga Basin Organisations) is 86 gazetted officers and 338 non-gazetted personnel (excluding Class IV staff). The organisational set-up of the Ministry is given in Appendix I. The budget allotment for the year 1965-66 was Rs. 30,56,000, whereas the revised estimates amount to Rs. 33,36,000.

Following the recent emergency, steps have been taken to effect economy in the expenditure on establishment. Four gazetted and nine non-gazetted posts have been abolished. It is also proposed to hold in abeyance 4 gazetted posts and 46 non-gazetted posts during the year 1966-67. Measures have also been adopted for reducing other administrative expenditure and a constant watch is being maintained for reducing expenditure on all items other than those which are inescapable and for eliminating such expenditure as could be postponed or avoided.

The officers and staff of the Ministry of Irrigation and Power and its attached and subordinate offices voluntarily contributed one day's pay to the National Defence Fund. The total contributions received and credited to the Fund so far exceed Rs. 75,000.

1.3 Accommodation

In lieu of the accommodation occupied by the Ministry in different places in New Delhi, compact office accommodation for the offices of the Ministry (Secretariat proper) was provided in a portion of the new building named "Shram Shakti Bhavan" on Rafi Marg. The Central Water and Power Commission, an attached office of this Ministry, has been allotted office accommodation for a number of its Directorates, in Ramakrishnapuram. A few Directorates of the Commission continue to be located in Bikaner House, New Delhi. A portion of the Power Wing of the Commission, which was previously functioning at Simla was shifted to New Delhi in April, 1965. In order to make the requisite space available for this portion of the Commission in New Delhi, it has been decided to shift some Directorates/Units of the Central Water & Power Commission from New Delhi to Faridabad, where office accommodation has already been allotted. The aforesaid measures have only partially solved the problem of accommodation of the offices of this Ministry and its attached Organisations. It has been felt that, when circumstances permit, it would be conducive to economy and efficiency to locate all the offices of the Ministry and its attached organisations in one compact building.

About 8 acres of land are being acquired near Hauz Khas, New Delhi, for setting up the Engineering Museum, Research Laboratories, Library and the Auditorium of the Central Water and Power Commission.

1.4 Sixth Congress of the International Commission on Irrigation and Drainage held at New Delhi

The Sixth Plenary Session of the International Commission on Irrigation and Drainage was held in New Delhi from the 4th to the 14th January, 1966. The Session was inaugurated by the President of India on the 6th January, 1966.

The Conference was attended by 193 distinguished Irrigation engineers from 34 foreign countries, besides representatives of 10 International Organisations and 239 Indian engineers. This international technical meet provided an excellent forum for the exchange of knowledge and experience gained by the member-countries of the Commission in the fields of irrigation, drainage and flood control. The main subjects discussed at the Congress were problems relating to the reclamation of saline lands, sediment control in irrigation channels, development of deltaic areas and integrated operation of reservoirs. Discussions on these subjects had a special significance for India at the present time when all out efforts are being made for optimum economic development of water resources for achieving self-sufficiency in food production. The Session was followed by study tours to important irrigation projects and places of historical and cultural interest in India. Some of the foreign delegates also attended the Golden Jubilee celebrations of the Central Water and Power Research Station, Poona, from the 23rd to 25th January, 1966.

1.5 Headquarters building of the International Commission on Irrigation and Drainage

The building for the headquarters of the International Commission on Irrigation and Drainage, which is located in New Delhi, was inaugurated by the Vice-President of India on the 10th January, 1966. The Government of India had allotted the Commission, free of cost, a plot of land measuring nearly one acre and also contributed a lakh of rupees for the construction of the building, and sanctioned a sum of Rs. 50,000 for purchase of equipment for the library of the International Commission on Irrigation and Drainage. The International Commission on Irrigation and Drainage is the only International organisation of its kind, which has its headquarters in India.

1.6 Visit of Foreign Dignitaries to India

(i) *Visit of the President and Secretary of the Institution of Civil Engineers, U.K.*

Mr. R. M. Wynne Edwards, President, and Mr. A. McDonald, Secretary, Institution of Civil Engineers, U.K., visited India from the 11th to the 14th April, 1965. They held discussions with the Minister of State for Irrigation and Power and with the Members of the Institution of Engineers, India.

(ii) *Visit of Mr. A. R. Mansell, a Member of the Legislative Council, Victoria, Australia.*

Mr. A. R. Mansell, Member of the Legislative Council, Victoria, Australia, arrived in India on 12th May, 1965, on a ten day visit, as a representative of the Victorian Branch of the Commonwealth Parliamentary Association. While in Delhi, Mr. Mansell held discussions with the Minister

of State for Irrigation and Power and officers of the Central Water & Power Commission on certain matters of common interest to India and Australia, relating to conservation and exploitation of water resources.

(iii) *Visit of Mr. V. A. Sergeev, Deputy Chairman, State Committee of Foreign Economic Relations, U.S.S.R.*

Mr. V. A. Sergeev, Deputy Chairman, State Committee of Foreign Economic Relations, U.S.S.R., met the Minister of State for Irrigation and Power in April, 1965, and discussed the proposal for making available the services of Soviet specialists for preparing a scheme report for the training, at Soviet, of operation and maintenance personnel required for large Thermal Power Stations in India.

(iv) *Visit of Mr. P. S. Neporozhny, U.S.S.R. Minister for Power*

The Minister of State for Irrigation and Power held discussions with Mr. P. S. Neporozhny, U.S.S.R. Minister for Power, on the 26th October, 1965 at New Delhi. The discussions covered the subjects of planning, designs and implementation of power projects in the country, in general.

1.7 Delegations abroad

(i) At the invitation of the State Production Committee on Power and Electrification of the U.S.S.R., Dr. K. L. Rao, Minister of State for Irrigation and Power, Choudhry Girdhari Lal, Minister for Irrigation and Power, Uttar Pradesh, and Shri Veerendra Patil, Minister for Public Works, Mysore visited the Soviet Union in June, 1965, as guests of the Minister of Power, U.S.S.R., for a period of two weeks.

The party studied the latest techniques employed in the U.S.S.R. on integration of power systems, construction of super-high voltage transmission lines, utilisation of solar energy and pre-cast construction of power houses and irrigation canal system. The Minister of State for Irrigation and Power has recorded his impressions on the visit of the party to U.S.S.R. in a report.

(ii) The Minister of State for Irrigation and Power visited Kathmandu from the 19th to 21st April and again from the 23rd to 25th April, 1965. The Prime Minister of India inaugurated work on the Western Kosi Canal on the 24th April. The Kosi Barrage was formally inaugurated by His Majesty the King of Nepal on the same day.

As a result of the discussions which the Minister of State for Irrigation and Power had at Kathmandu, His Majesty's Government of Nepal have agreed, in principle, to release land for the West Kosi Canal. In that connection, His Majesty's Government have suggested certain amendments to the Kosi Agreement of 1954. These have been examined and our views communicated to His Majesty's Government through our Embassy at Kathmandu. Further discussions to finalise these are in progress.

(iii) Shri P. R. Ahuja, Chief Engineer and ex-officio Joint Secretary of the Ministry, was deputed to attend the First Session of the Co-ordinating Council of the International Hydrological Decade convened by the UNESCO at Paris from the 24th May to the 4th June, 1965. Shri Ahuja was unanimously elected as the Chairman of the Council and of the Directing Bureau for a term of two years. Shri Ahuja was also deputed to attend the meeting of the Directing Bureau of the International Hydrological Decade held at Paris from 13th to 15th December, 1965.

1.8 The Indus Waters Treaty, 1960

The permanent Indus Commission, set up under Article VIII(i) of the Indus Waters Treaty, 1960, submitted its Annual Report for the year ended on 31st March, 1965, to the Governments of India and Pakistan, in May, 1965. Three meetings of the Commission were held during the period from 1st April, 1965 to 28th February, 1966.

As required under Article V of the Treaty, the sixth annual instalment amounting to Rs. 8,27,46,666.67 (or £6,206,000) was paid to the World Bank for the Indus Basin Development Fund on 1st November, 1965.

1.9 Co-operative Development of the Waters of the Rivers in the Eastern Zone of India and Pakistan

As decided at the meeting of the Water Resources Experts of India and Pakistan held in December, 1961—January, 1962, clarifications/supplementation/elucidations on the data exchanged in respect of the Farakka Barrage Project (India), the Ganges-Kobadak Project (East Pakistan) and the Projects on the river Teesta in India and East Pakistan were continued to be supplied on a reciprocal basis.

1.10 Co-operative approach on Flood Control Measures in Eastern Zone

Flood warning messages were transmitted to East Pakistan by Indian authorities during the monsoon season in accordance with the agreement reached between the Governments of India and Pakistan in August, 1956.

1.11 Ganga Basin Water Studies

Hydrological observations and recording of data on discharges and sedimentation in the Ganga Basin rivers were continued.

1.12 Consultants

During the year, four senior retired engineers (three on the irrigation side and one on the power side) with wide and varied experience, continued to work as part-time consultants for giving second opinion on designs etc. of major irrigation, flood control and power projects.

1.13 Publications and publicity

Bhagirath, the official journal of the Ministry, continued to be published as a Quarterly. An illustrated *Bhagirath* Pamphlet titled "India's Temples of the Nehru Age", giving a succinct picture of the progress of water and power resources development since Independence, a Pocketbook captioned "India—Irrigation and Power Projects (Five Year Plan)", giving statistical information relating to major irrigation, flood control and power projects in each State, and a Monograph "All about Sharavathy", were published.

CHAPTER II

CENTRAL WATER AND POWER COMMISSION

2.1 The Central Water and Power Commission is charged with the general responsibility of initiating, coordinating and furthering, in consultation with the concerned State Governments, schemes for the control, conservation and utilisation of water resources throughout the country, for purposes of irrigation, navigation, flood control and water-power generation, thermal power development and transmission and utilisation of electric energy throughout the country.

The Commission consists of a Chairman, a Vice-Chairman and six Members, three each in the Water Wing and Power Wing. The organisational set-up of the Commission is given in Appendix II.

As the Commission is the highest expert body of irrigation and power engineers at the Centre, it is essential for it to keep abreast of the rapid developments that are taking place in the field of irrigation and power engineering and to maintain contacts with both national and international engineering organisations. To achieve this objective, representatives of the Commission participate in international engineering conferences, symposia and seminars, and engineers are also sent overseas for specialised training. During the year, 16 officers of the Commission proceeded abroad for training under various foreign aid programmes. Wherever necessary and possible, services of foreign specialists are obtained for advising and assisting the Commission. In its turn, the Commission provides training facilities for engineers from State cadres and also, as a part of India's contribution to some of the aid programmes, to engineers from some other countries.

2.2 Delegations Abroad

Shri K.P.S. Nair, Vice-Chairman, Central Water and Power Commission, left New Delhi for Washington on 10th April, 1965 as leader of the Indian delegation for carrying out negotiations with the World Bank authorities in respect of the following two loan agreements, which were signed on the 11th June, 1965 :—

(i) IBRD Loan for Tansmission Programme (70 million dollars).

(ii) IBRD Loan for Kothagudem, Stage-II (14 million dollars).

Shri C. V. Gole, Director, Central Water and Power Research Station, Poona, was deputed to attend the First Plenary Meeting of the Technical Committee of the International Organisation for Standardization—ISO/TC 113—on Measurement of Liquid Flow in Open Channels—and its four working Groups held in London from 24th May to 4th June, 1965.

Shri R. C. Shenoy, Director, Hydrology and Statistics, attended the International Symposium on Design of Hydrometeorological Networks at Quebec City (Canada) held from the 15th June to 22nd June, 1965. He also attended a Session of the Working Group on Universal Decimal Classification of the Commission for Hydrometeorology from the 28th June to 3rd July, 1965. He visited Denver (USA) during the intervening period

of five days and held discussions with U.S.S.R. engineers on Flood Estimation Techniques.

Shri S. S. Murthy, Director, Super Grid, was deputed to France, West Germany and Switzerland, for 25 days in June-July, 1965, to study problems relating to the day-to-day operation of inter-connected power systems, generation schedules in various seasons, load despatching and frequency control overhaul and maintenance programme for generating plant, principles of tariff governing exchanges of power, etc.

Shri C. L. Handa, Member (Designs and Research), was deputed to attend the 33rd Executive Meeting of the International Commission on Large Dams held at Lausanne (Switzerland) on the 5th and 6th September, 1965. He also attended the XI Congress of the International Association for Hydraulic Research held at Leningrad (USSR) from the 7th to 11th September, 1965, and joined the connected study tour.

Dr. I. C. dos M. Pais Cuddou, Director, Central Soil Mechanics Research Station, attended the Sixth International Conference on Soil Mechanics and Foundation Engineering, held at Montreal (Canada) from the 7th to 15th September, 1965 and participated in the connected study tour.

At the invitation of the Vienna Institute of Development, Shri M. R. Chopra, Chairman, was deputed to Austria and some European countries, for a period of twenty days in January and February 1966, to deliver a series of lectures on the developments in India in the field of Irrigation and Power.

2.3 Foreign Experts

(i) The services of some foreign experts have been made available to the Central Water and Power Commission from time to time under various aid programmes, like U.S. Agency for International Development, U.N. Special Fund and U.N. Expanded Programme for Technical Assistance. They were engaged on programmes for training in operation and maintenance of heavy earthmoving equipment and utilisation thereof, survey of sites for potential hydroelectric projects, design and investigation of river valley projects, design of high earth dams and rockfill dams, etc. Eleven such experts are at present working in the Central Water and Power Commission.

(ii) An agreement was signed on the 20th September, 1965, between the Government of India and the Soviet authorities, for the services of five Soviet Specialists for rendering technical assistance to the Thermal Designs Organisation of the Power Wing of the Commission for a period of three years. Three of the specialists reached New Delhi in October, 1965 and the remaining two joined in January, 1966.

(iii) Another agreement was signed on the 18th October, 1965 between the Government of India and the Soviet authorities, for the services of two Soviet Specialists, for preparing a scheme report for the setting up of an Institute at Neyveli for the training of operation and maintenance personnel required for large thermal power stations. These specialists have also arrived.

2.4 Training facilities for Engineers in the Central Water and Power Commission

Since 1954, 57 engineers from different States have received training in the Water Wing of the Commission under this Scheme. Six

engineers (three each from Mysore and Assam) are currently undergoing training. Engineers from Philippines, Afghanistan and Ceylon were given training facilities in the Water Wing of the Commission, under the Technical Co-operation Scheme of the Colombo Plan. Four officers from Ceylon, Thailand, and the Philippines arrived for training in the Power Wing of the Commission under the Colombo Plan.

2.5 Publications and Publicity

Eighty-one technical publications were brought out and distributed to engineering organisations in the country.

Documentary films on Mechanised Concreting, Panniar, Bhakra and Sharavathy Projects were completed and are expected to be released shortly. Work on the production of 16 more films is in progress. In addition, publicity material like display advertisements, brochures and posters on development of irrigation, power, flood control measures etc. are being brought out. Publicity literature was also supplied to the External Publicity Division for distribution to Indian Embassies abroad.

2.6 Miscellaneous

One Reception Office *cum*-Enquiry-*cum*-Complaint Cell, has been set up at Bikaner House and another at Ramakrishnapuram, where most of the offices of the Commission are located.

REVIEW OF WORK DONE DURING THE YEAR BY THE CENTRAL WATER AND POWER COMMISSION

I. WATER WING

2.7 Irrigation and Navigation

Comments were offered on irrigation aspects of 28 original and 59 follow-up projects received from the States.

The responsibility for control of release of waters from the DVC reservoirs has been vested in the Chairman, C.W. & P.C.

2.8 Technical Examination

Out of the projects included in the Second Plan, 169 project reports were received in the Commission. Of these, 158 projects were cleared by the Advisory Committee of the Planning Commission, 2 schemes were under examination in the Central Water and Power Commission and 9 schemes pending with the State Governments for furnishing further details.

Out of the projects included in the Third Plan, project reports for 84 schemes were recievd in the Commission. Of these, 69 projects were cleared by the Advisory Committee of the Planning Commission, 3 schemes were under examination in the Central Water and Power Commission, and 10 schemes were pending with the States for further details. Project reports in respect of the remaining two schemes were awaited from the States.

Thirty-four non-Plan schemes (Irrigation and Multipurpose Projects) were received during the year in addition to the twenty-nine already under examination. One scheme, *viz.* Tubewells in the Western Yamuna Canal Tract was cleared by the Advisory Committee of the Planning Commission.

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The remaining schemes were in various stages of examination and correspondence with the States.

2.9 Designs

The Commission continued to function as the specialised organisation for the preparation of designs of river valley projects. Various aspects of preparation of designs and specifications of projects are dealt with in the three Dam Design Directorates and the Canal Design Directorate of the Commission. The designs etc. of a number of projects were technically scrutinised during the year. Technical Memoranda on the following subjects were prepared :-

(i) Design Criteria for Penstocks;

(ii) Recommended methods of calculating stress with sketches;

(iii) Draft Code for fabrication design and testing of welded Penstocks;

(iv) Hydraulic Testing and field testing of Penstocks;

(v) Draft Code for welded Penstocks;

(vi) Draft specifications for design standardization of gates;

(vii) Draft specifications for fixed wheel vertical light gates for the Indian Standards Institution;

(viii) Barak Earth dam with special reference to the construction programme taking into account the short working season;

(ix) Tunnel spacing; and

(x) Hydraulic and structural designs of tunnel spillway.

The Commission continued to render assistance to the States in the preparation of detailed designs etc. of special features of projects under construction.

2.10 Machinery and Equipment

Efforts were continued to ensure that utmost use was made of surplus machinery and equipment available on completed projects by arranging transfers to other projects in need of such equipment, so that foreign exchange expenditure on obtaining fresh supplies could be reduced to the barest minimum.

Equipment valued at Rs. 38.40 lakhs was declared surplus by different States during the period. The value of equipment disposed of during the period from 1-4-65 to 31-12-65 was about Rs. 130.90 lakhs. Equipment, valued at Rs. 3.57 lakhs, was located from surplus stocks for meeting demands involving imports. Spares, valued at Rs. 3.9 lakhs, were also declared surplus by different States/Projects. The total value of spares disposed of during the same period was about Rs. 4.26 lakhs. Spares, valued at Rs. 1.85 lakhs, were located from surplus stocks against demands for import.

Annual health and efficiency reports in respect of machinery from different projects in the States were scrutinized and, where equipment performance was not considered satisfactory, drawbacks and their remedies were brought to the notice of the project authorities for effecting improvements.

2.11 Hydrology and Statistics

Hydrological [illegible] Irrigation and Power Projects were examined and comments [illegible] Flood Studies in respect of 19 Projects, including Mettur [illegible] Low Stream Studies for Micro Hydel Schemes, were also carried out. Water Year Books for eight river basins for the year 1962-63 [illegible] basins for 1962-63 were compiled.

Frequency [illegible] flood discharges, storm rainfall for certain rivers river catchments [illegible]

2.12 Surface Water Resources

Comprehensive [illegible] proposed to be carried out by the Commission for [illegible] Ganga, Brahmaputra and the Indus, with [illegible] available data on the balance of water available after [illegible] and committed demands, for river valley projects [illegible] Plans.

Studies on the Tapi and Mahanadi basins were taken up and were in progress. Preparation of basin maps for the Tapi and Mahanadi river basins [illegible] meteorological stations, was completed.

2.13 Technical Manpower

In order to impart specialized training for the operation and maintenance of heavy construction machinery, to ensure full and efficient utilization of the construction equipment available on the various river valley projects in the country, the Commission has been running Technical Training Centres at Kotah, Nagarjunasagar Dam site, Nangal and Kakrapar. These four Training Centres continued to function with improved methods and efficiency, for the increased strength of 60 trainees at each Centre. So far, 911 persons have completed training. The duration of the training course is one year and this training programme is proposed to be continued in the Fourth Five Year Plan.

2.14 Cost Control

The Commission continued to scrutinize project estimates in respect of rates and provisions, and to advise States and Project Control Boards regarding rates, tenders and contracts.

Fifty-two project estimates were scrutinized from the point of view of rates and provisions. In addition to this, fifty-one replies received from the State Governments to the observations made by the Commission on project estimates were also examined and further remarks offered, where necessary.

2.15 Recording and expediting of progress on Projects

A close watch was kept on the progress of all the plan schemes under execution. Suitable action was taken, as and when necessary, to remove bottlenecks, impeding progress of construction. A review of major and medium projects, in a fairly advanced stage of construction, was undertaken and acceleration of a number of projects was recommended for their early completion.

A Reviewing Committee reviewed the progress of certain selected projects with a view to assessing the possibility of achieving the targets according to schedule. 13 major projects were reviewed and realistic targets of benefits

likely to be achieved were fixed. A continuous watch was also kept on the progress of creation of irrigation potential and utilisation thereof.

The proposals received from the States regarding Fourth Plan irrigation schemes were scrutinized. In respect of continuing schemes and new schemes proposed, the optimum outlays required and the benefits to be expected from them during the Fourth Plan period were examined with a view to formulating the Fourth Plan proposals.

2.16 Metric Cell

A 'Metric Cell' was set up in the Central Water and Power Commission in December, 1965 to assist the various Organisations in the Irrigation and Power Sector at the Centre and in the States in the change over to the metric system of weights and measures.

2.17 Central Water & Power Research Station, Poona

The Central Water & Power Research Station, Poona, the premier organisation for hydraulic and allied engineering research in the country, continued to assist the Ministries of Defence, Transport, Communications and Railways, the Designs Directorates of Central Water and Power Commission, State Governments, Electricity Boards, Port Trusts, Shipyards, etc., in preparing designs of works for flood control, river training, irrigation and power projects, bridges, ports, harbours and ships. Model studies, field investigations, geophysical studies, laboratory tests, statistical and mathematical analysis were undertaken for tackling the various problems referred to this Station.

This Research Station celebrated its Golden Jubilee from January 23 to 26, 1966. The Golden Jubilee celebrations were inaugurated on January 23, 1966, by the Minister of State for Irrigation and Power. The new laboratory buildings of the Station were also declared open by the Minister that day.

Symposia on "Model and Prototype Conformity" and "Modern Trends in Hydraulic Engineering Research", covering the participation of 103 authors from 24 countries of the world, were held during the celebrations.

The experimental knowledge and experiences continually accumulating through the research work at the Station are published in the Annual Research Memoirs Volumes and Technical Memoranda separately issued from time to time. In order to further disseminate the growing technological knowledge among personnel of Engineering Institutions and other organisations, periodical short-term Refresher Courses are held at the Station. Some universities have granted affiliation to the research conducted under the aegis of the Central Water and Power Research Station for award of post-graduate degrees. Plans are afoot for instituting post-graduate research as a regular feature of the activities of the Station.

The Research Station has recently been further equipped for experimental stress analysis studies. Studies on Foundation Engineering have also been initiated on a bigger scale. The Instrumentation Division has succeeded in perfecting a propeller type miniature current meter. Wave height recorders and automatic tide generators, ship models with radio control and other instruments have also been evolved. A cavitation research laboratory is being set up with assistance from the U.N. Special Fund and some officers of the Research Station have been given special training.

Work on Soil and Rock Mechanics, Earthquake Engineering and Model Engineering is being initiated to cope with some of the more intricate problems for which solutions have to be furnished by the Station to the Design Organisation of the Central Water & Power Commission.

A fully equipped 'A' class Weather Bureau is also working in the Station.

All the Laboratories have now been housed at Khadakvasla in special buildings, which are being further equipped.

2.18 Central Soil Mechanics Research Station, New Delhi

The Central Soil Mechanics Research Station continued to perform very useful work, such as surveys, investigations, collection of essential sediment data and research on suspended sediment sampling equipment, construction material etc., required for the design and execution of irrigation and power projects and flood control schemes in the country. The Station also conducted research on problems allotted to it by the Central Board of Irrigation and Power.

During the period under review, extensive field and laboratory investigation for "borrow" areas and foundations of dams, barrage and heavy structures were carried out. Investigations on certain important research problems, *viz.* correlation of mechanical and mineral composition of clays of different soils in the country with their engineering properties and shear characteristics of undisturbed and remoulded soils, were done.

A course for imparting training in geophysical investigation was started in collaboration with the U.N. Special Fund.

Special research investigations were carried out on the manufacture of pozzolan-cement, on laboratory scale, by using lime—fly-ash mixtures in one series and granulated blast furnace slag in the other.

Discharges of suspended sediment data in respect of various grades of sediment, for 84 sites in different States, were checked, tabulated and coordinated in standard proforma in annual statement form, monthly basis, ten day basis, and mean basis. The Research Station also prepared a technical bulletin on hydrological sediment data of different river systems of the country.

In connection with the Soil Conservation programme of the Ministry of Food & Agriculture, a regular course of 6 weeks duration, on the techniques of collection and analysis of suspended sediment load, bed material survey etc. was conducted by the Station for trainees from various States and organisations in the country. About 70 candidates are trained under this programme every year.

Chemical analysis of routine testing of cement, lime surkhi, fly ash, set cement mortars and concrete, etc. was carried out. Investigations were also carried out on the use of Cetyl Alcohol for restricting evaporation losses in two Tanks in Rajasthan. Soil survey was carried out in the command area of the Giri Project in Himachal Pradesh.

With assistance from the U.N. Special Fund, the Central Soil Mechanics Research Station has recently been equipped with the latest type of special testing equipment.

2.19 Flood Control and Soil Conservation

The Central Water and Power Commission continued to assist State Governments in the planning and execution of flood control works, besides attending to the secretariat work of the Central Flood Control Board.

During the year, three major schemes, viz. the Sahibi Flood Control Project in Rajasthan, construction of marginal embankments along the Bagmati in Bihar, and of an embankment in Purnea District (Bihar) opposite Malior Beel Bund (West Bengal), estimated to cost Rs. 6.08 crores and 15 minor schemes, estimated to cost Rs. 5.54 crores, were received for examination. Out of these, two minor schemes were examined and recommended to the Planning Commission for approval. The 3 major schemes and the remaining 13 minor schemes were examined and comments communicated to the State Governments concerned.

The Flood Atlas of India for the years 1954-59, containing a history of the past and present flood problems and the progress made towards solving them, has been finalised for all the States, except Jammu and Kashmir, Mysore and Maharashtra, and the Union Territories. The printing of the Atlas has been taken up. The work of preparation of Flood Atlas for the year 1960 onwards is in progress. A popular Flood Atlas intended to present pictorially to the general public the magnitude of flood damage in the country and the progress of flood control works is under print.

The Flood Forecasting Unit, set up in 1958, to evolve suitable techniques for forecasting the gauge of the river Yamuna at the Delhi Railway Bridge, carried out further studies to improve the accuracy of the forecasts and issued forecasts to the Delhi Administration during the flood season of 1965. The Flood Forecasting Unit also rendered advice to the States for formulating flood forecasting schemes of their problem rivers. A scheme for the river Rapti in Uttar Pradesh was prepared. A unit for forecasting the inflows from the Sahibi Nadi, upstream of Dhasa Bund, is also functioning in the Commission.

A cell has been set up in the Central Water and Power Commission to deal with the problem of waterlogging, which has assumed serious proportions in recent years. Relevant field data would be collected for providing technical assistance to the States. The cell would also co-ordinate inter-State anti-waterlogging schemes.

A Beach Erosion Board has been set up to tackle the problem of sea erosion in Kerala on scientific basis. A Coastal Engineering Research Centre is also proposed to be set up.

Close liaison was maintained with State Governments, the Ministry of Food & Agriculture and the Planning Commission, to ensure speedy preparation and execution of soil conservation schemes in river catchments.

A Flood Control Unit headed by a Chief Engineer was set up under the Delhi Administration for executing flood control schemes in Delhi.

II. Power Wing

2.20 Technical Examination and Coordination

Assistance was continued to be rendered to the State Governments and project authorities in connection wtih various aspects of power projects

requiring technical scrutiny and guidance. The Commission also undertook detailed load [illegible] and field surveys of the Andaman and Nicobar Islands, Manipur and Tripura.

The Commission continued to scrutinize project reports of power projects received from State Governments/Union Territories and processed them for approval by the Technical Advisory Committee of the Planning Commission.

[illegible] to the Indian Standards Institution in the formulation/revision of Indian Standards and scrutiny of various British and Commonwealth Draft Standards and I.E.C. recommendation on transmission and distribution system materials.

Programmes for the commissioning of various generating units of power projects in the public and private sectors, were reviewed and assistance was rendered to the project authorities in removing difficulties and bottlenecks being experienced by them.

2.21 Planning and Designing Projects

(a) *Specialised Engineering Organisation (Hydro)*

The two Hydroelectric Design Directorates rendered, as in the past, complete design and engineering services to the following projects :—

(i) Rana Pratap Sagar Power Station (Rajasthan)
(ii) Jawahar Sagar (Kotah) Power Station (Rajasthan)
(iii) Kosi East Canal Power Station (Bihar)
(iv) Upper Sileru Hydroelectric Project (Andhra Pradesh)
(v) Srisailam Hydroelectric Project (Andhra Pradesh)
(vi) Trisuli Hydroelectric Project (Nepal).
(vii) Jaldhaka Hydroelectric Project (West Bengal)
(viii) Gumti Hydroelectric Project (Tripura)
(ix) Thumper Hydroelectric Project (Bhutan)
(x) Rongni-Chu Hydroelectric Project (Sikkim)

Assistance was rendered to the State Governments and other Project authorities in the preparation and vetting of purchase specifications for generating plant and electrical equipment, and scrutiny of tenders.

Complex engineering problems, such as :

(i) Turbine cavitation at Bhakra Power House,
(ii) Transformer burn-out at Bhakra Power House,
(iii) Bearing damage at Koyna Power House,
(iv) Lightning Arrester failure at Koyna Power House,
(v) Erosion damage to turbines at Mohora Power House,
(vi) Damage to circuit breaker on the electrification of Central Railways, and
(vii) Feasibility of operating turbines at low head conditions at Muniraabad Power Station,

were referred to the Commission by the concerned State Governments and Project authorities for technical advice and necessary assistance was rendered to them.

(b) *Specialised Engineering Organisation (Thermal)*

This Organisation, set up for rendering consultancy service to project authorities in the work of engineering, designs, procurement and construction of large-sized thermal power stations, continued to render assistance in the design, layout and execution of Pathratu Thermal Station (Bihar), Obra Thermal Power Station (U.P.), and Neyveli Thermal Station Extension (Madras), in collaboration with the Russian authorities, who are supplying the generating units for these projects. Technical assistance was also rendered by this Organisation to the Directorate General of Supplies and Disposals and the project authorities in the work of bulk purchase of equipment for the Ramagundam, Satpura, Talcher and Indraprastha (Delhi) Power Stations. Assistance was also rendered for [illegible] the estimates for Neyveli Thermal Power Station Extension. A feasibility report, on the proposal for setting up of a thermal power station at Badarpur near Delhi, was prepared, featuring the technical and economic criteria for selection of the power plant and suitability of the site. The Organisation continued to maintain progress regarding the work relating to detailed design, layout and specifications for all thermo-electric equipments, and scrutinized project reports of the second stage extension of Satpura Thermal Power Station, Kalakot Thermal Power Station, Koradi (near Nagpur) Power Station, etc.

This Organisation is being developed to minimise dependence on foreign consultants and to avoid, as far as possible, expenditure involving foreign exchange. Five Soviet engineers, specialists in various branches, have been attached to this Organisation so that modern know how becomes readily available and the Organisation could be developed at a rapid pace.

2.22 Development of Regional Grids and All India Grid

Studies relating to interconnection and integrated operation of various power systems in the Eastern Region on a long-term basis extending up to 1980-81, undertaken in Paris, in collaboration with Electricite De France and Messrs. SOFRELEC, under the Indo-French Technical Assistance Programme, were in progress. A Report covering these studies is being finalised in consultation with the French authorities. The studies have shown the need for the introduction of 400 kV transmission lines in the Fourth Plan period and development of 400 kV interconnections in the subsequent plan periods. A Report on the comparative study of the West Bengal transmission system with alternative transmission voltages was scrutinized and advice given.

The specification for 400 kV line materials prepared by the West Bengal authorities was examined and comments were offered.

In the Southern region, the Mysore and Madras Power systems have been interconnected by means of 220 kV line and power from Sharavathy hydroelectric power station in Mysore has started flowing into the Madras Grid. The scope for meeting power shortages in the States of Kerala and Andhra Pradesh also by utilization of Sharavathy power was being examined in consultation with the State Electricity Boards.

Short-term studies were made for meeting the power shortage conditions in the Chambal area in Rajasthan and Madhya Pradesh.

Long-term studies, covering the various regions, were in progress. Side by side, studies on development of Regional interconnections with a view to evolving an all India Grid were initiated

Programmes were drawn up for carrying out the various power system studies on the Digital Computer and these studies were also carried out on the Computer.

A preliminary [illegible] and equipment, together with their costs, for 220 kV and 132 kV lines and sub-stations, envisaged during the Fourth Plan period was prepared for making a broad assessment of the foreign exchange requirements.

The [illegible] at present being supplied by the DVC [illegible] in Bihar, to the Bihar State Electricity Board was [illegible] in consultation with the DVC and Bihar authorities.

2.23 Rural Electrification

During the [illegible] schemes envisaging a total capital outlay of [illegible] Scheme reports under the special programme for extension of from 14 States [illegible] for lift irrigation, with a view power connections [illegible] For achieving the target of electrification of to increasing food production [illegible] the Birth Centenary of Mahatma a total of [illegible] State Governments and State Electricity Boards Gandhi in October 1969, the State Governments and State Electricity Boards were requested to take special measures.

2.24 Electricity Legislation and Electricity Tariffs

Question raised by State Electricity Boards/Electricity Supply Undertakings regarding the interpretation of the Indian Electricity Act, 1910, the Electricity (Supply) Act, 1948, and the Indian Electricity Rules, 1956, were examined in the Commercial and System Planning Directorate and suitable advice given. Statutory inspections of medium voltage and high voltage electrical installations were carried out in certain Union Territories and in Central Government installations under some Central organisations.

Electricity rates analysis for various electricity supply undertakings was continued to be done.

2.25 Power Research Institute

The Power Research Institute at Bangalore has been in operation since 1960-61 for providing facilities for carrying out applied research in the field of power engineering. The Laboratories and Testing installations both at Bangalore and Bhopal units of the Power Research Institute are now under various stages of development. Most part of the foreign equipment has already arrived and orders for indigenous equipment have also been placed. Necessary action for obtaining additional assistance from the U.N. Special Fund has also been taken. The Laboratory building at Bhopal is due to be completed by March, 1966, and the Switchgear Testing Station is expected to start functioning in full swing by August, 1966.

At Bangalore, about 2300 sq. metres of temporary building space has been constructed within the campus of the Indian Institute of Science,

Bangalore. Land is being acquired for putting up permanent buildings and laboratories.

2.26 Hot Line Crew Training Centre at Bangalore

As the Hot Line Crew Training Centre at Bangalore had already trained a sufficient number of candidates sponsored by State Electricity Boards, and had achieved the purpose for which it was set up, the Centre was closed down with effect from the 1st December, 1965.

CHAPTER III

IRRIGATION, FLOOD CONTROL & POWER DEVELOPMENT

I IRRIGATION

3.1 Development of Irrigation Facilities

Prior to the commencement of planning, only about 22.60 million hectares were provided with irrigation facilities in India. Development of irrigation during the Second and Third Plans would bring the total area irrigated in the country to about 30.32 million hectares. About 500 major and medium projects are being taken up during the three Plans which, on completion, would irrigate 17.81 million hectares. The benefits from these projects by the end of the Third Plan will, however, be limited to about [illegible] hectares in the terminal year. According to present indications, an outlay of about Rs. 810 crores is likely to be available for major and medium irrigation schemes during the Fourth Plan period, which would create an additional potential of 5.20 million hectares. Although these schemes have contributed significantly to agricultural production, much still remains to be done to attain self-sufficiency in food production.

Assured irrigation is one of the basic inputs of agricultural production. It is also an essential pre-requisite for multiple cropping and intensive use of land. It has, therefore, become imperative to extend the area under irrigation rapidly within the resources available.

The Ministry of Irrigation and Power have made a careful study of the possibilities of extension of irrigation facilities and are concentrating their attention on speedy completion of a number of selected major and medium irrigation projects, even by providing additional funds, which can yield a benefit of about 1.21 million hectares in the next 2 to 3 years. The other measures being considered are energising of as large a number of pumping sets as possible, and the speedy execution of an emergent programme of lift irrigation which together would benefit an area of about 0.60 million hectares.

The Ministry of Irrigation and Power and the Ministry of Food and Agriculture have also been emphasising multiple cropping, particularly utilisation of regulated supplies available from some of the major hydro-electric projects like Rihand, Hirakud etc. During this year, senior officers headed by the Chairman and Members of Central Water and Power Commission visited some of the States and impressed upon them the necessity and the urgency of implementing this programme. The detailed steps to be undertaken in this regard have been communicated to the State Governments. By sustained efforts, it should be possible to develop irrigation facilities for nearly 0.60 million hectares.

NOTE : 1 hectare = 2.47 acres.

Additional Central assistance for the following projects was granted during the year 1965-66 to accelerate construction with a view to realising irrigation benefits earlier :

	(Rupees in lakhs)
1. Nagarjunasagar	1000
2. Tungabhadra High Level Canal	160
3. Tawa	100
4. Mahanadi Delta	80
5. Kosi	50
6. Gandak	50
7. Six Irrigation Projects in Kerala (Second Stage I & II, Pothundy, Chitturpuzha, Periyar Valley, Gayatri and Pamba).	110

II. Flood Control

3.2 During the year 1965, floods were comparatively less severe and were mainly confined to parts of Assam, Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh and West Bengal. The rainfall in the monsoon season was less than normal in most parts of the country. A distinct feature of this year's floods in the Brahmaputra, Kamla Balan and Gandak was that these were caused by heavy rainfall in the head reaches and not by rainfall in the plains. The acute flood situation in parts of Rajasthan, Uttar Pradesh and Madhya Pradesh was due to abnormally heavy rainfall in the catchments of some drains and rivers.

In Assam, floods in the Brahmaputra started in the first week of June and continued up to the middle of September. There were in all 19 breaches and 11 cuts in the embankments along the Brahmaputra and its tributaries. Of the 19 breaches, 5 were due to erosion. A serious situation was created due to erosion at Gohaingaon near Jorhat, and at Goalpara on the leftbank of Brahmaputra. A retired bund was constructed at Gohaingaon and temporary measures were taken at Goalpara to keep the erosion under control.

In Bihar, there were serious floods in the Kamla Balan and Bagmati in the second week of July. As a result, considerable damage occurred in Darbhanga, Champaran and Muzaffarpur districts.

In Madhya Pradesh, there were heavy rains in the first week of July in the districts of Sehore, Raisen and Vidisha, causing serious floods in the Betwa and its tributaries. Large areas were inundated and road and telecommunications between Bhopal and neighbouring districts were dislocated.

Heavy rainfall in the Pahari-Kaman area of Rajasthan in the first week of September caused serious drainage congestion in the area. Kaman town was inundated and road communications were affected.

Heavy rains in the Goverdhan area of Mathura district of Uttar Pradesh in the first week of September caused widespread inundation in the Mathura and Agra Districts. The overflow from the Goverdhan drain caused breaches in the embankment and disrupted road and rail communications in the area.

There were high floods in almost all the North Bengal rivers in the second week of August. The floods in the Teesta caused inundation in the low-lying areas of Jalpaiguri town.

According to the assessment made so far, the floods of 1965 affected an area of about 19 lakh hectares including a cropped area of about 2 lakh hectares. The estimated damage to crops was to the extent of about Rs. 3 crores. A population of nearly 30 lakhs in 4,900 villages was affected. The number of houses damaged was nearly 22,000. The floods took a toll of 76 human lives. The total damage has been assessed at about Rs. 7 crores.

State Governments are paying more and more attention to the programme of flood protection with a view to minimise flood damage.

The Minister of State for Irrigation and Power visited the flood affected areas in the States of Assam and Bihar and held discussions with the State Ministers and officials. He suggested the following measures to be taken :—

(i) In view of the need for a continuous study, collection of data and research, it would be desirable to associate the University of Gauhati with studies of the Brahmaputra.

(ii) For proper relief measures of the embankments in Assam, it is of utmost importance to enlist public co-operation through Panchayats and organise vigilant patrolling.

(iii) Provision of a larger waterway for the Jhanjharpur Bridge across Kamla in Bihar.

(iv) Model experiments to devise protective works and provision of embankments on the Kamla Balan.

(v) Soil conservation measures in the upper catchment area of Kamla.

(vi) Establishment of a Flood Forecasting Unit and improvement of communication facilities in the Kamla basin.

Appropriate action on these is being taken in consultation with the State Governments.

3.3 Progress of Flood Control works and benefits therefrom

Flood protection measures such as provision of new embankments, raising and strengthening of existing embankments, river training works, and raising of villages were continued during the year. Since the inception of the National Programme for Flood Control in 1954 till the end of the Second Plan, an expenditure of about Rs. 63 crores was incurred on flood control measures. The total expenditure during the Third Plan is anticipated to be about Rs. 85 crores.

Up to the end of March, 1966, an area of 44 lakh hectares is expected to be benefited by flood control measures. In addition, 80 towns would have been protected against floods and erosion, and over 4,300 villages raised above the high flood level.

3.4 Soil Conservation

The Third Plan envisaged an outlay of Rs. 11 crores for a centrally sponsored programme of soil conservation works in the catchments of 14 river valley projects, *viz.* Kosi, projects in Damodar Valley, Mayurakshi,

Kang abati, Hiranki, Machkund, Tungabhadra, Kundah, Ghod, Damiwada, Bhakra-Nangal, [illegible] and Pong (Himachal Pradesh), Co-ordinated [illegible] in respect of all the [illegible] except Kosi, Kosi, [illegible] been prepared by the State [illegible] against a Plan [illegible] except Kosi, first 4 years at an expenditure of about R[illegible] during the [illegible] it is expected [illegible] and during 1965-66, of Rs. [illegible] expenditure been taken up has been stepped up. [illegible] which work has

In order to survey the sediment load coming into the reservoirs from their respective catchments, a number of silt observation posts have been established and more are being set up.

III. Power Development

3.5 In the context of the emergency, it has become necessary to reorient the policy in regard to execution of power projects, so as to ensure rapid realisation of benefits. The following have been laid down as the main guidelines in the implementation of power projects :—

(a) Those power schemes which are in advanced stages of execution, and the bulk of the equipments in respect of which have arrived, should be completed with utmost expedition, so that benefits might be derived early.

(b) The equipments for the power projects are to be obtained as much as possible from indigenous sources.

(c) Emphasis is to be laid on the early completion of inter-State transmission lines. This is essential in order that power might be transmitted from one State to another to meet emergent needs.

(d) Programme of rural electrification with a bias towards promotion of agricultural pumping is to be intensified. Production of additional food is of paramount importance and energising of agricultural pumps will go a long way in increasing food production.

(e) Dependence on foreign consultants for design work is to be eliminated as early as possible. The objective is to have the entire work of designs of thermal stations in the country done by Indian engineers.

There would be some shortfall in achieving the original target of 12.7 million kW of installed capacity by the end of the Third Plan. The achievement is likely to be about 10.5 million kW of installed capacity.

Some of the factors that have been responsible for delays in implementation of the projects are stated below :—

(i) procedural delays in getting the projects accepted by foreign aid-giving agencies;

(ii) shortage of free foreign exchange to import equipment not covered by foreign assistance;

(iii) procedural delays in regard to appointment of consultants, finalising award of contracts etc.;

(iv) absence of a systematic attempt to prepare a realistic schedule of construction and taking up necessary progressive action for implementing the projects;

(v) delays in awarding contracts for civil works and completion thereof in time for commissioning of power stations;

(vi) delays in making cooling water supply at Thermal Power Stations; and

(vii) delays in supplies of steel and cement from indigenous sources.

3.6 Electric Power Survey of India

Under the auspices of the Electric Power Survey Committee set up by the Government of India in December, 1962, the First Annual Electric Power Survey was carried out and finalised in July, 1963 and the results of the survey were embodied in a report which also presents a broad picture of the power requirements of the country in the next few years. In submitting this report the Electric Power Survey Committee was aware that while the picture presented in this report for the immediate future is firm, as far as the long-term requirements are concerned, the estimates would vary depending upon the economic growth and the pace of industrialisation in the country.

The above project was assisted by the USAID by arranging for the participation of a number of foreign experts in the survey. The Governments of the United Kingdom, Belgium, France and the Organisation for Economic Cooperation and Development made available some of their experts to work with the Committee. The Detroit Edison Company of U.S.A. also placed their valuable experience in Power Survey in the United States and elsewhere at the disposal of the Committee.

The Second Annual Power Survey was finalised and issued in May, 1964. Since then, the Third Annual Electric Power Survey has also been finalised and published in May, 1965. The Fourth Annual Electric Power Survey is being initiated and a questionnaire has already been issued to the State Governments.

3.7 Rural Electrification

Extension of electric power in the rural areas can create social revolution by bringing about far-reaching changes in the methods of irrigation and farming, and by affording opportunities for the growth of small scale industries and commerce and provision of amenities generally associated with urban areas. The extension of rural electrification has, therefore, been taken up as a socio-economic necessity.

At the beginning of the First Five Year Plan, only 3,641 villages were electrified. During the First and Second Plan periods, the progress of rural electrification gradually gathered momentum, bringing the total number of electrified villages to nearly 26,900 (out of 5.7 lakh villages) at the beginning of the Third Five Year Plan (1-4-1961). During the Third Plan period, against a provision of Rs. 110 crores and a target of electrifying 20,000 additional villages, about 19,000 additional villages had already been electrified up to the end of March, 1965, and it is expected

to exceed the target by about 7,800 villages. Thus, the achievement at the end of the Third Plan period (31-3-1966) will be electrification of about 54,700 villages.

With a view to increasing agricultural production in the country by providing quick facilities for irrigation from wells, it was decided to provide loan assistance to the States on easier terms for extension of power distribution lines, over and above the plan ceiling during the last two years of the Third Plan. During 1964-65, a sum of Rs. 240 lakhs was sanctioned as loans to the Governments of Andhra Pradesh, Bihar, Madras, Maharashtra, Punjab, Rajasthan and Uttar Pradesh who had submitted scheme reports fulfilling the criteria laid down for this assistance. During 1965-66 a sum of Rs. 881 lakhs has been allocated to the States of Andhra Pradesh, Bihar, Gujarat, Madhya Pradesh, Madras, Mysore, Orissa, Punjab, Rajasthan and Uttar Pradesh. It has now been decided that while drawing up schemes for rural electrification during the Fourth Plan period, priority should be given to those villages where clusters of irrigation wells are available and where such clusters exist in the neighbourhood of sub-transmission and distribution lines, so that the maximum benefits of lift irrigation could be obtained with the minimum expenditure. With this object in view, it has been decided that the rural electrification programme should be co-ordinated with the programme of energisation of irrigation pump sets. The States have been advised to draw up schemes to cover an area of group of villages having clusters of pumps, at the same time meeting the other rural loads in that area. Also, while the schemes should be formulated with a bias towards agricultural production, the aim should be to cover simultaneously, as far as possible, 15% to 20% of villages in the States during the Fourth Plan period.

The extension of electricity lines to the rural areas, where the load is scattered, involves considerable expenditure. In order to increase the tempo of rural electrification, a proposal for liberalization of the terms of financial assistance to the States in this respect, is under consideration. Also in order to extend the benefits of pump irrigation on a large scale, it is felt that the rate for power supply to agriculturists in the different States should tend towards uniformity. Accordingly, a proposal to provide subsidy on electricity rates for agricultural purposes in excess of 12 paise per unit, to be shared by the Centre and the States concerned in the ratio of 50 : 50 has been agreed to by the Government of India. The subsidy scheme would, in the first instance, be introduced for three years. The State Governments would have to find the funds necessary for meeting their share of the expenditure on the payment of subsidy from their own resources. For the purpose of ascertaining the excess of electricity rates for agricultural purposes over 12 paise per unit, the rates in force on January 1, 1966, or the rates prevailing on any later date, whichever are lower, would be taken into account. The States are also to give an undertaking not to revise upwards, during the period of three years mentioned above, the electricity rates for agricultural purposes.

3.8 Electricity Legislation

The Electricity (Supply) Amendment Bill, 1965, to amend the Electricity (Supply) Act, 1948, was introduced in the Lok Sabha on the 29th November, 1965. This Bill is likely to be taken up for detailed discussion in 1966 during the Budget Session of Parliament. The Bill seeks to remove

certain anomalies and difficulties which have come to notice in the working of the Electricity (Supply) Act, 1948. The Bill also seeks to :—

(i) facilitate raising of capital required for development;

(ii) tighten the control over financial operations of private licensees; and

(iii) permit appointment of Members of Parliament, State Legislatures etc. as Members of State Electricity Boards, after they cease to be Members of Parliament, Members of State Legislatures etc.

IV. GENERAL

3.9 Investigation of Hydroelectric Projects

The Central Water and Power Commission continued to act as the co-ordinating agency for the aid programme, under which the United Nations Special Fund have given assistance by way of essential equipment not available in India, costing $ 2,200,000 for the investigation of 62 hydroelectric projects in 13 States.

Under this scheme, investigations on 50 projects were in progress and 24 of them had reached an advanced stage.

Action for purchasing almost all the equipments, provided in the Plan of Operation, was initiated.

Equipment worth $ 1,400,000 was received in India and distributed to the various agencies executing the scheme.

3.10 Progress of Investigations undertaken by the Central Water and Power Commission

The Central Water & Power Commission continued to undertake investigations of various river valley projects at the instance of the Central and the State Governments, with a view to assessing the power and irrigation potential and preparing project reports for consideration and inclusion in the Five Year Plans. A brief review of the investigation work carried out during the year, is given below :—

Andhra Pradesh

The Commission concentrated their activities on two major projects, viz. (i) Hydrological observations in Krishna and Godavari basins and (ii) Diversion of Godavari waters to Krishna. Gauge and discharge observations in the Krishna-Godavari basins were continued. So far, 60 gauge and discharge observation stations have been established, out of 76 planned under this scheme. Preparation of the feasibility report on two link canals, viz. Godavari-Pulichintala and Polavaram-Vijyawada canals was in progress.

Assam

The Commission took up investigations at Narayandhar site of Barak Dam project, as Mainadhar and Bhubandhar sites were found to be unsuitable. The Barak Technical Committee is now examining the feasibility report prepared on the basis of data collected so far.

Jammu & Kashmir

Collection of hydro-meteorological data in the Chenab basin and investigations for Bursar and Sawalkot dam projects and geological investigations for Liddar Project were continued.

Madhya Pradesh

Project reports on Punasa Unit- -II, Upper Ken, Wainganga, Barwaha, Haranphal and Sindh Projects were completed and forwarded to the State Government.

The reports in respect of Hasdeo (Phases II & III), Urmal, Bargi, Sagar, Parvati and Punasa Projects were under finalisation. Reports on Tons, Bah and Hasdeo Phase I (Darri Weir) were also under examination.

Nagaland

Investigations for feasibility of micro-hydel schemes in Nagaland were continued. Project reports on the Diphupani and Tuenyang schemes were finalised. It was decided to drop the Changki scheme due to inadequate flow in the river. Investigations on Kerholi and Nanung schemes were completed and survey work on Mallak scheme remained in progress.

Delhi

Investigations for a scheme envisaging widening and deepening of the Najafgarh Drain and construction of a supplementary drain connecting Najafgarh Jheel with the Yamuna were undertaken and the drafting of the report on the supplementary drain was completed.

Necessary surveys in connection with establishing a thermal power plant of 300 MW capacity at Badarpur (near Delhi) were carried out and the feasibility report prepared. Further investigations required for preparation of the project report remained in progress.

Goa, Daman & Diu and Nagar Haveli

Assessment of the water potential in Goa and field investigations on Salai, Mondovi Pipria Projects were under progress. Their feasibility reports were being completed.

NEFA

Investigations in NEFA for micro-hydel schemes were continued. Draft reports on Passighat, Tezu, Along and Bomdila Schemes were finalised. Notes were prepared for Towang and Tuting Schemes. Field work on Towang, Tuting and Passighat extension Schemes remained in progress.

Bhutan

Investigations in Bhutan were continued. The investigations on Paro, Thimpo, Wangede Phundrong and Ha Projects were completed, along with preliminary investigations on Chukha Hydroelectric Scheme, a major project. Further investigations on Phuntshelling, Sarbang, Deothang and Teshigong and detailed investigations on Chukha Scheme were almost in the final stage of completion. Construction of Thimpu Hydroelectric Scheme was in progress.

3.11 Supply of Scarce Materials

Cement : The Central Water and Power Commission is the sponsoring authority for the requirements of cement for Irrigation and Power Projects costing more than rupees one crore each. The demands of projects costing less than Rs. one crore each are met by the State Governments out of the quota allotted to them. During the year, the demands sponsored by the Central Water and Power Commission aggregated 29 lakh tonnes. Against this, the allotment made amounted to 16 lakh tonnes. With effect from 1st January, 1966, cement has been decontrolled.

Steel : During the period from 1-4-65 to 31-3-66, the Central Water and Power Commission sponsored a demand of 68,001 tonnes. Out of this, the allotment received was only 13,139 tonnes. It was, however, possible to secure a further allocation of 10,858 tonnes of M.S. Plates of thickness 8 mm and above.

Vehicles : Assistance was rendered to irrigation and power projects in the matter of release of vehicles. A monthly quota of jeeps was secured from the Ministry of Industry and Supply (Department of Industry) for meeting the requirements of these projects. After making allocations for the period ending 31-12-65, it was possible to meet in full, the pending demands in respect of Jeeps.

Non-ferrous Metals : Supply and utilization of zinc, copper, lead and tin has been controlled with the promulgation of the Scarce Industrial Materials (Control) Order on 14-9-65. Efforts are being made to obtain necessary quota from the Directorate General of Technical Development to meet the demands of fabricators in regard to scarce non-ferrous metals.

3.12 Foreign Exchange

The Foreign Exchange position continued to be very tight. However, it was possible to earmark foreign exchange funds under various credits for ordering plant and equipment for power projects, besides covering some requirements under (i) Trade Agreements with various East European countries including U.S.S.R., (ii) Colombo Plan, (iii) various credits, and (iv) free resources of the country.

A delegation consisting of Shri K. P. S. Nair, the then Vice-Chairman, Central Water and Power Commission, as leader and Shri S. Dutt, Joint Secretary, Ministry of Finance (Department of Coordination), Shri C. Laxmipathy, Chief Engineer and Shri Parthasarathy, Chief Controller of Accounts, Andhra Pradesh Electricity Board, as members conducted negotiations with the World Bank authorities at Washington in April, 1965, and finalised the terms and conditions of World Bank Loan for (i) Power Transmission Schemes under the Third Plan and (ii) Kothagudam Power Station—Stage II. Agreements for loans amounting to $ 70 million and 14 million respectively were entered into with the World Bank to cover the requirements of the aforesaid two schemes. An agreement with Exim Bank of Japan was also signed to procure equipment worth Rs. one crore for various power distribution schemes. Consortium aid and USAID assistance are also being sought to meet the requirements of a few more projects.

3.13 Reviewing Committees for Irrigation and Power Projects

(a) *Irrigation Projects*

A Reviewing Committee was set up under the Chairmanship of Shri M. R. Chopra, Chairman, Central Water and Power Commission, to examine the progress of works in some selected irrigation projects and to take necessary steps for removing, as far as possible, the difficulties and bottlenecks experienced in the execution thereof. So far, the progress on 13 projects has been reviewed and suitable recommendations communicated to the State Governments and project authorities concerned.

(b) *Power Projects*

Similarly, a Reviewing Committee was set up under the Chairmanship of Shri K. L. Vij, Vice-Chairman, Central Water and Power Commission, to review, from time to time, the progress of execution of certain important power projects and to eliminate the difficulties faced by the project authorities in order that benefits envisaged from such projects could be realized as early as possible.

3.14 Inter-State Accord

(a) A number of important inter-State matters relating to irrigation supplies and flood control, concerning Punjab, Rajasthan and Uttar Pradesh were considered at a meeting convened on 5th January, 1966, by the Union Minister of State for Irrigation and Power. The meeting was attended by the Irrigation and Power Ministers of Punjab, Rajasthan and Uttar Pradesh. Agreement was reached on all the issues. Some of the important decisions taken at the meeting are given below :—

(i) *Distribution of Ravi and Beas Waters between Punjab and Rajasthan*

It was agreed that Rajasthan should get 35% of the surplus waters of Ravi and Beas up to 31-3-1967. The existing procedures for regulating and sharing supplies between Punjab and Rajasthan are to be examined with a view to effecting improvements, if necessary.

It was also decided that Punjab should give Rajasthan 50 cusecs of regeneration supplies in river Sutlej between Rupar and Harike on an *ad hoc* basis till March, 1970.

(ii) *Sharing of the cost of Ghaggar Flood Diversion Scheme between Punjab and Rajasthan*

The Rajasthan Government have undertaken a scheme for the diversion of flood waters of the river Ghaggar entering its territory from Punjab, into depressions in the sand dunes. The sharing of the cost of this scheme has been under dispute but it was agreed at a meeting that this should be shared between Punjab and Rajasthan in the ratio of 40 : 60.

(iii) *Construction of a Second Syphon at the crossing of river Ghaggar and Rajasthan Feeder*

This was one of the long-pending issues between Rajasthan and Punjab, and an agreement was reached at the meeting on its construction and the allocation of its cost to the Rajasthan Canal Project.

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(iv) *Tajewala Headworks across the Yamuna river*

An agreement was reached to remodel the Tajewala Headworks across the Yamuna river, as a barrage, to help overcome the difficulties being experienced at present in passing river supplies into the Eastern Yamuna Canal. The Central Water and Power Commission has been asked to prepare necessary designs and estimates immediately. The cost of the barrage will be shared by Punjab and Uttar Pradesh.

(v) *Supply of water from Agra Canal in Chainsa and Rampur distributaries of Gurgaon Canal System*

As a part of the Gurgaon Canal system, the Punjab Government have constructed Chainsa and Rampur distributaries on the left side of the Agra Canal in Gurgaon district. Water has to be pumped from Agra Canal to feed the Chainsa distributary and a regulator has to be constructed at Mile 15 of the Agra Canal to feed the Rampur distributary. It has now been agreed that U.P., as a temporary measure, will permit till March, 1967, supplies being taken from the Agra Canal for feeding these two distributaries and by that time permanent arrangements consisting of a pump house on the right bank of the Agra Canal for the Chainsa distributary along with an aqueduct or a syphon (as the case may be, depending upon the economics) and a regulator and a syphon for the Rampur distributary from the Gurgaon Canal have to be provided by Punjab.

(vi) *Utilisation of Waters of Krishnavati and Sahibi rivers*

An agreement has also been reached between Punjab and Rajasthan to share the waters of the Krishnavati half and half and the waters of the Sahibi in the ratio of 60 : 40 respectively.

It was also decided to set up a Committee consisting of the Chairman, Central Water and Power Commission and the Chief Engineers of Uttar Pradesh and Punjab to examine the question of transfer of control of some of the distributaries taking off from Agra Canal falling in Punjab territory.

(b) *Mahi river development*

The progress on the Mahi river project had been slowed down owing to differences between the Gujarat and Rajasthan Governments on the sharing of cost of construction of the Banswara Dam in Rajasthan. These differences were resolved at a meeting held in New Delhi on January 10, 1966, between the Irrigation Ministers of the two States under the Chairmanship of the Union Minister of State for Irrigation and Power, and an agreement was reached. The terms of the agreement are as follows :

Kadana Dam

Kadana Dam should be built to FRL 419.00. The entire cost and benefits of this Project will be borne by Gujarat. At a later date, when Mahi areas are fed by Narmada waters and a part of the Kadana waters are released for use in Rajasthan, Rajasthan should pay to Gujarat an appropriate cost of the Dam for such use. The exact proportions will be fixed at the time when such releases become available.

Banswara Dam

Banswara Dam across Mahi, located in Rajasthan, will be built to FRL 921.00. Out of the total cost of the Dam, a portion will be allocated for power which Rajasthan will develop from the waters of this reservoir. This will be at the rate of Rs. 1,250 per kW firm power. If the total cost of the Dam increases beyond Rs. 14 crores, the allocated cost per kW taken above will also be increased proportionately.

The cost of the Dam for FRL 915.00 should be shared between Gujarat and Rajasthan in the ratio of 40 : 9, as the utilisation of the waters for irrigation inclusive of evaporation losses are 40 TMC in Gujarat and 9 TMC in Rajasthan.

Building the Dam up to FRL 921.00 will give an additional storage of 7 TMC which will be useful in lean years for ensuring firming of power generation. In view of this, Rajasthan has agreed to bear the difference in cost for building the Dam between FRL 921.00 and FRL 915.00.

At a later date, when Narmada development takes place and when Mahi areas are fed by the waters of Narmada and the Mahi waters at Banswara are released for use in Rajasthan, Rajasthan should reimburse the cost of the Banswara Project paid by Gujarat.

3.15 Special Measures for expediting power projects and increasing Food Production

(i) *Expeditious completion of Power Projects*

The Minister of State for Irrigation and Power has addressed the State Ministers in-charge of Electricity on the urgent need to speed up construction of those power projects for which machinery has already been received, by introducing additional shifts and arranging for work round the clock, so that the requirements of power for essential purposes could be fully met.

(ii) *Maximum utilisation of Irrigation Potential*

The Minister of Irrigation and Power has suggested to State Governments that immediate action may be taken to step up food production in the context of the present emergency and the need to attain self-sufficiency. The following measures, for extension of irrigation facilities, have been recommended :—

(1) Raising second crop from supplies available in rivers;

(2) Concentrated action to ensure immediate utilisation of irrigation potential created by the projects in advanced stage of construction.

The Chairman and Members of the Central Water and Power Commission (Water Wing) were deputed to the States to discuss with the State Chief Engineers the emergent steps to be taken and to draw up detailed programmes to be implemented on priority basis.

CHAPTER IV

BOARDS AND AUTONOMOUS BODIES

4.1 Damodar Valley Corporation

The Barrage and Irrigation System of the Damodar Valley Corporation is being operated and maintained by the Government of West Bengal on behalf of the Corporation.

During 1964-65, actual *kharif* irrigation was about 2.68 lakh hectares against the target of 3.93 lakh hectares and *rabi* irrigation was about 15,573 hectares against the target of 22,258 hectares.

The second unit of 140 MW at the Chandrapura Thermal Power Station was commissioned in May, 1965. Good progress is being made on the third unit of 140 MW which is expected to be commissioned by the middle of 1967. Work on the third unit of 140 MW at Durgapur Thermal Power Station, which was expected to be commissioned by mid-1966, is proceeding apace but, on account of delay in the receipt of the condenser and the feed-water heaters, delay in fabrication and erection of power house structural steel by the contractors and in the completion of civil works, the unit is now likely to be commissioned only by the end of 1966. Augmentation of the transmission and distribution system is also proceeding apace.

With the addition of the second unit at the Chandrapura Thermal Power Station, the generating capacity of the DVC power system has been raised to 781 MW from which about 500 MW can be sold to the consumers on firm basis after making allowance for overhaul of generating system, auxiliaries and line losses. The interconnections established between the DVC system, the Rihand Hydro Power Plant of U.P., the Coke-Oven Power Plant of Durgapur and the Thermal Power Station of Sindri Fertilisers, continued to be mutually beneficial and enabled the D.V.C. to maintain continuity of supply from its grid.

The revised power tariff of the DVC came into force on the 1st April, 1965. The tariff had to be revised because of the undertaking given to the World Bank at the time a loan was negotiated for the 3rd Unit of the Durgapur Thermal Power Station that the D.V.C. Power Tariff would be increased to provide for a return of at least 7% on the net value of the assets in use during the year. However, following certain representations against the upward revision of the tariff, the Government of India, in consultation with the participating Governments of West Bengal and Bihar, have set up a Committee to go into the matter and make recommendations. The Committee is expected to submit its report shortly.

As regards the D.V.C. navigation canal, the Corporation have entered into an agreement (on open tender basis) with M/S Hindustan Shipping Co., Ltd., Calcutta, for the commercial operation of the canal. The shipping firm have started a bi-weekly cargo service between Durgapur and Calcutta.

Miscellaneous development works relating to soil conservation, afforestation, fisheries, public health, agriculture and the general well-being of the community are in progress in the valley according to a phased programme.

The financial aspects of reorganisation of the Corporation on a functional basis are under consideration of the Government of India in consultation with the participating State Governments of West Bengal and Bihar.

Payment of minimum bonus was sanctioned by the Corporation to its employees for the year 1964-65 in terms of the provisions of the Payment of Bonus Act, 1965.

4.2 National Projects Construction Corporation

The National Projects Construction Corporation, which was incorporated in January 1957 under the Companies Act, 1956, with an authorised capital of Rs. 200 lakhs divided into 20,000 equity shares of Rs. 1,000 each, has now a paid-up capital of Rs. 200 lakhs of which Rs. 100 lakhs has been contributed by the Central Government and the balance by the State Governments of Assam, Bihar, Gujarat, Jammu & Kashmir, Kerala, Madhya Pradesh, Mysore, Punjab, Rajasthan, Uttar Pradesh and West Bengal.

The Corporation has in hand the execution of works costing over Rs. 39 crores. During 1964-65, the Corporation executed works costing Rs. 6.58 crores and earned a net profit of Rs. 52.81 lakhs, the highest profit earned by the Corporation in any year so far. A dividend of 6% was declared for 1964-65.

4.3 Central Board of Irrigation & Power

The Central Board of Irrigation and Power continued its activities for the promotion and co-ordination of research on the designing and construction of irrigation and power projects. Work on the Fundamental and Basic Research Scheme, which is being done under the supervision of the Board, made good progress. The results have been incorporated in the annual reviews issued by the Board.

The Board held two meetings during the year : (i) the 35th Research Session; and (ii) the 38th Annual Session. The 35th Research Session was held at Ranchi in July 1965, and was inaugurated by the Chief Minister of Bihar.

The 38th Annual Session of the Board was held at New Delhi, from 6th to 8th November, 1965, and was inaugurated by the Union Minister of State for Irrigation & Power. Two Symposia, one on "Measures to Accelerate Food Production in the Country" and the other on "Indigenous Manufacture of Power Generating Equipment in India" were also held during the Session.

International Activities

The Board continued to function as India's National Committee for the International Commission on Large Dams and the International Commission on Irrigation and Drainage, and as Liaison Body for the International Association for Hydraulic Research.

The 16th Executive meeting of the International Commission on Irrigation and Drainage, held at Athens from 28th April to 10th May, 1965

was attended by Shri K. L. Bhatia, Secretary of the Indian National Committee.

As stated earlier, the International Commission on Irrigation and Drainage held its 6th Plenary Session at New Delhi from 4th to 14th January, 1966. The Central Board of Irrigation and Power, which acts as the Indian National Committee, made all the arrangements for the Session.

4.4 Central Electricity Authority

The Central Electricity Authority has been constituted under the provisions of Section 3 of the Electricity (Supply) Act, 1948. The authority is required to exercise such functions and perform such duties under the Act and in such manner as the Central Government may prescribe or direct.

The Authority at present consists of five members including its Chairman.

The Central Electricity Authority has no staff of its own. Secretarial assistance is provided by the Directorates of the Power Wing of the Central Water & Power Commission.

The Regional Electricity Boards are under the administrative control of the Central Electricity Authority. In the light of experience gained since the establishment of the Central Electricity Authority and the present stage of power development, the reorganisation of the Authority is at present under consideration.

4.5 Regional Electricity Boards

In addition to the Southern and Western Regional Boards established earlier, the following three Regional Electricity Boards also started functioning during the year :

(i) The Northern Regional Electricity Board with its headquarters at Ghaziabad;

(ii) The Eastern Regional Electricity Board with its headquarters at Patna; and

(iii) The North-Eastern Regional Electricity Board with its headquarters at Shillong.

The following items of work have specifically been assigned to the Regional Electricity Boards :—

(i) to collect complete details about all the power stations, transmission lines, sub-stations, thermal efficiency of coal consumed, losses in transmission and distribution and auxiliaries, rural electrification etc. in respect of the constituent States of each region;

(ii) to undertake a study in regard to the various components constituting the price structure for inter-State power supply with a view to examining how best the rates of power supply in the region could be made uniform;

(iii) to undertake a study of the various automatic equipments used in the power systems;

(iv) to undertake studies with a view to standardisation of the equipments required for transmission lines and sub-stations so that no separate design need be taken up for each individual project; and

(v) to set up a technical library which may contain literature of all types on the subject of inter-State links, operation of power systems, standardisation of equipment etc.

A delegation consisting of the Member-Secretaries of the Southern and the Western Regional Electricity Boards and the Director (Super-Grid) of the Central Water & Power Commission visited France, West Germany and Switzerland in June-July 1965, for studying the problems of day-to-day operation of interconnected power systems, generation schedules in various seasons, load despatching and frequency control, overhaul and maintenance programme for the generating plant, principles of tariff governing exchanges of power etc. The reports submitted by the delegation are being examined.

4.6 Central Electricity Board

The Central Electricity Board was set up under Section 36A of the Indian Electricity Act, 1910, for the purpose of framing of rules for the generation, transmission and utilisation of electricity. The Board consists of 8 nominated members from the various Ministries/Departments of the Government of India and representatives of the State Governments, State Electricity Boards and Federation of Electricity Undertakings etc. The Thirteenth meeting of the Board was held at Shillong on 29th and 30th July, 1965, when it considered and finalised proposals for certain amendments to the Indian Electricity Rules, 1956.

CHAPTER V

IMPORTANT COMMITTEES AND CONFERENCES

5.1 Conference of the Chairmen of State Electricity Boards

A conference of the Chairmen of State Electricity Boards was held at New Delhi on 24th and 25th November, 1965, to consider various questions relating to the rural electrification programme during the Fourth Plan.

The conclusions reached at the Conference are given below :—

(1) *Rural Electrification Programme During the Fourth Plan*

It was agreed that the rural electrification programme should be intensified during the Fourth Plan. However, emphasis should be on the energisation of clusters of irrigation pumps, keeping in view the availability of underground water in various areas.

(2) *Terms and Conditions for supply of Electricity to Agricultural Consumers*

It was agreed that the terms and conditions for supply of electricity to agricultural consumers should be liberalised. The following guidelines for the States were also agreed to :

(a) Minimum consumption guarantee may be fixed at not more than Rs. 35 per connected horse power per annum.

(b) The cost of distribution lines should not be charged to agricultural consumers at all.

(c) The cost of service line for the first 100 feet should not be charged to the consumer as laid down in the Indian Electricity Act, 1910. The cost of the line beyond 100 feet may be recovered by the Board from agricultural consumers as a lump-sum or in 60 monthly instalments without interest.

(d) Fixation of security deposit equivalent to two months' average consumption may be accepted as the standard pattern.

(3) *Forming of Rural Co-operatives in India*

It was agreed that one rural electricity co-operative should be formed, as a pilot project, in each State after the subject has been discussed with experts from the USAID.

(4) *Administrative Arrangements for promoting Rural Electrification*

It was emphasised that there should be suitable advisory bodies at State and district levels in order to co-ordinate the programme of rural electrification with other development activities. The State Consultative Councils on development of electricity should be made more effective and there should be District Advisory Committees to keep close liaison with Development Officers and other authorities in the district.

(5) *Incentives to Farmers for use of Electricity in Agricultural Production*

It was also suggested that the following incentives may be given to agricultural consumers :—

(a) A time limit should be set by the Boards for giving electricity connections so that agriculturists can get the benefit of pumping in the cultivation season.

(b) During the period when there is no water in the well or during rainy season when water from the well is not required for irrigation purposes, the minimum consumption guarantee may not be insisted upon from agricultural consumers.

(c) In certain States, "no objection" certificates have to be obtained by agricultural consumers from a number of authorities before they are able to get electricity connections. The Boards should consider ways and means of cutting short the consequent delays so that there is no undue hardship to agriculturists on this account.

(d) The Boards may take up electrification of the areas inhabited by Harijans from the funds provided for "Harijan Welfare".

(6) *Rate for Agriculturists*

The consensus of opinion appeared to be that the rate of 12 paise per kWh would be reasonable and that subsidy should be given by the State/Central Government for the portion of the rate above 12 paise per kWh. However, a ceiling should be fixed for subsidization so that there is no risk of high rates being fixed merely for getting higher subsidy.

(7) *Inter-State Sale of Electricity*

A committee was constituted, with Shri V. Venugopalan, Member, Central Water and Power Commission, as convenor, and a representative each of the Mysore, Maharashtra, Gujarat, Punjab, Uttar Pradesh and West Bengal State Electricity Boards as Members, to suggest the principles for determining rates etc., which may be followed in case of sales of electricity by one State to another.

(8) *Low Voltage Conditions in Rural Areas*

It was agreed that all the Boards should take steps to ensure that the voltage conditions in rural areas are improved.

(9) *Role of Private Electricity Undertakings in Rural Electrification*

There is no objection to licensees working as agents of Electricity Boards in executing rural electrification works within the jurisdiction of the respective Boards.

(10) *Need for Amendment of Indian Electricity Act*

It was agreed that the question of amending the Indian Electricity Act, 1910, should be examined, in order to ensure that rural electrification work did not suffer from any legal difficulties.

5.2 Conference of the State Ministers of Irrigation & Power

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late Prime Minister, Shri Lal Bahadur Shastri, and was also addressed by the Deputy Chairman of the Planning Commission. Among the subjects discussed was acceleration of execution of those irrigation and power projects which are in an advanced stage of construction so that the maximum benefits possible could be obtained in the next two to three years. The need for according high priority to double cropping or multiple cropping, where possible, and measures for speeding up rural electrification, especially for energising pump sets, were also stressed. The subjects discussed and a summary of the decisions taken, are given below :—

ITEM No. 1 *Acceleration of the Irrigation Programme for increasing food production.*

(i) Continuing schemes should receive special attention, so that these can be completed in the course of the next two to three years and water supplied to cultivators for growing more food.

(ii) The need for undertaking a vast programme of tubewells in suitable tracts and of electrifying shallow wells, was emphasised.

(iii) The importance of multiple cropping and supplementing food production, by raising potatoes and other tubers in greater quantities, was recognised.

ITEM No. 2 *Fourth Plan Power Programme.*

The target of generating power to the extent of 21 million kW by the end of Fourth Plan, as fixed by the Planning Commission was considered inadequate. It was decided that a fresh load survey should be conducted immediately, to reassess the demand for power. In any case, the target for the Fourth Plan should not be less than 24 million kW.

ITEM No. 3 *Review of steps taken by State Governments for attaining the targets set for the Irrigation & Power Sectors for the Birth Centenary of Mahatma Gandhi.*

The creation of an irrigation potential of 100 million acres (40.48 million hectares) and the electrification of 1,00,000 villages to mark the Birth Centenary of Mahatma Gandhi in 1969 was decided upon at the First Conference of State Ministers for Irrigation & Power held in January, 1964. The progress made so far to achieve these objectives was reviewed. It was found that in order to attain the irrigation target, creation of an additional irrigation potential of about 6 million acres (2.43 million hectares) through major and medium irrigation projects, was necessary. It was agreed that all-out efforts should be made to reach the target of electrification of 1,00,000 villages in the country by October, 1969. It was also decided to electrify 7 lakh pump sets during the Fourth Plan.

The conclusions reached at the Conference of the Chairmen of State Electricity Boards held on the 24th and 25th November, 1965 were endorsed by this Conference.

ITEM No. 4 *Irrigation Projects—Recommendations of the Nijalingappa Committee on Betterment Levy.*

The concept of betterment levy was accepted, leaving the fixation of the quantum and the mode of recovery to State Governments, who were requested to implement the recommendation as early as possible.

ITEM No. 5 *Proposed Central Equipment Pool—Administrative Arrangements.*

The proposal for the creation of a Central Equipment Pool was accepted in principle. The scheme would be operated by the Central Water and Power Commission.

ITEM No. 6 *Apportionment of expenditure on Technical Training Centres between the Central and State Governments.*

The representatives of State Governments pleaded for the continuance of the existing centres which were doing very useful work. They pointed out that owing to their strained finances, it was not possible for them to accept any additional financial liability and pressed that the Government of India may continue to bear the entire expenditure on the running of these Training Centres, as hitherto.

ITEM No. 7 *Steps to be taken for the constitution of the Indian Service of Engineers (Irrigation and Power Branches).*

While reviewing the progress of action on the implementation of the proposal, clarifications on certain aspects of the scheme were sought by some State representatives. It was decided that, the State Governments may formally communicate their views to the Home Ministry, so that the Service could be constituted as soon as possible.

ITEM No. 8 *Provision of incentives for Research Workers in Irrigation & Power Research Stations.*

To attract and retain the best available talent for research work, the importance of providing incentives and opportunities for professional rise to research workers, was recognised.

5.3 Flood Control Boards, Committees etc.

Fifteen State Flood Control Boards, assisted by Technical Advisory Committee at the State level, and 4 River Commissions at Inter-State level are functioning in the country. A Flood Control Board for the Union Territory of Delhi and its adjoining areas has also been set up. The Central Flood Control Board co-ordinates the work of the State Flood Control Boards and the River Commissions.

In pursuance of the recommendations of the Ministers Committee on Flood Control, two Standing Committees, one for settling disputes in respect of sharing the cost of providing additional waterways under existing railway bridges or for constructing new bridges, and the other, in respect of bridges on National Highways, have been set up. Other recommendations of the Committee are under consideration in consultation with the Planning Commission, the concerned Central Ministries and the State Governments.

The recommendations of the Committee on Scientific Flood Forecasting, which had submitted its report in January, 1965, are under consideration.

The undermentioned Committees, which have been set up after the floods of 1964, have submitted their reports :—

(i) *Study Group for making a comprehensive assessment of the problem of erosion by the Brahmaputra.*

The Study Group has submitted its report, which deals with the causes and extent of erosion at specific points along the river Brahmaputra and measures usually adopted in other countries for dealing with similar problems. It has also suggested certain remedial measures to be taken in this connection.

(ii) *Committee to make scientific assessment of the problem of drainage congestion in certain States.*

This Technical Committee was set up to make an assessment of the problem particularly in Gurgaon (Punjab) and Bharatpur (Rajasthan) and the Western districts of Uttar Pradesh and to suggest a cemprehensive scheme for the proper drainage of the region. The Committee has suggested increasing the capacity of the Pahari-Kaman-Goverdhan drain in different reaches.

(iii) *Committee for suggesting a comprehensive plan for controlling floods in the coastal areas of Andhra Pradesh in the Districts of Godavari, Krishna and Guntur.*

This Committee was appointed in October, 1964, under the Chairmanship of Shri A. C. Mitra, Engineer-in-Chief, Uttar Pradesh, and submitted its report in January, 1966. A number of general as well as specific recommendations have been made by the Committee for controlling floods in the coastal rivers like Budameru, Thammileru and Yerrakalva by constructing flood control reservoirs and other measures; for lowering the flood levels in the Kolleru lake which submerges large areas every year and for improvement of the present inadequate drainage system in the fertile Godavari and Krishna deltas. The works recommended by the Committee are estimated to cost about Rs. 22 crores and will help to reduce the large-scale damage to crops that occurs almost every year in this area. The recommendations made by the Committee are under consideration.

(iv) *Committee to draw up a comprehensive plan for flood protection in Delhi and surrounding areas.*

Important recommendations of the Committee include retention of the Dhasa Bund, increasing the capacity of Dhasa and Kakraula regulators and the Najafgarh drain to 3,000 cusecs, and construction of a supplementary drain from upstream of Dhasa Bund to join the Yamuna. Action on a number of recommendations has already been taken.

Expert Committees were appointed to make detailed studies of drainage problems in : (a) North Bihar, and (b) the contgiuous areas of Western Uttar Pradesh and Rajasthan. Another Committee was set up to consider long-term measures for the protection of the Chitauni Bund from the ravages of the Great Gandak.

5.4 Power Telecommunications Co-ordination Committee

The Committee continued its functions of examining the routes of all high voltage lines for inductive co-ordination with the P & T communication lines, and assisting the State Electricity Boards in obtaining the allocation of frequencies for power line carrier system.

The power grids of Madhya Pradesh, Maharashtra, Rajasthan and Mysore were studied on the D.C. Network Analyser for determination of fault levels at various locations of the grids. Studies were made for the improvement of the D.C. Network Analyser fabricated by the Committee last year. Work for evolving a simplified procedure for examination of parallelism with power lines up to and including 33 kV, was also initiated.

5.5 Committee on Ways and Means for Improving Financial Returns from Irrigation Projects (Nijalingappa Committee)

The report of the Committee was examined by the Ministry in consultation with the Ministry of Finance and the Planning Commission. Various recommendations of the committee have been commended to the State Governments for acceptance and action.

5.6 Godavari Anicuts Committee

The Committee submitted its report on the 30th November, 1965. Copies of the reports have been sent to the Government of Andhra Pradesh for initiating action.

5.7 Committee on Instrumentation of Dams and Structures

The Committee on Instrumentation of Dams and Structures constituted in October, 1964, under the Chairmanship of Shri P. S. Bhatnagar, Chief Designs Engineer of the Bhakra and Beas Designs Organization, submitted its report in December, 1965. The report includes a review of instrumentation already done in various hydraulic structures in the country and recommends how best the instrumentation programmes can be improved in future.

The main recommendations of the Committee are given below :—

(i) As a general rule, means should be provided for observing behaviour of all concrete, masonry and earth dams.

(ii) Each State Government should constitute an adequately staffed specialised Cell, to undertake the work of planning, installation, observation and analyses involved in instrumentation programmes of their projects.

(iii) It is necessary to substantially augment the existing Instrumentation Cell in the C.W. & P.C. to render it effective in co-ordination, collection and interpretation of instrumentation data pertaining to the large number of projects completed or in hand.

(iv) Regular training and refresher courses should be organized to train the personnel for the specialised cells to be constituted in the States.

(v) The instrumentation of dams and other structures is of sufficient importance as to warrant pre-allocation of funds in foreign exchange for the import of necessary instruments till such time as indigenous equipments are available.

(vi) The requirements of various projects can best be met by advance planning and procurement, rather than from a centrally maintained stock of instruments.

(vii) The Committee has also suggested criteria for assigning due priority to various kinds of instruments for indigenous manufacture.

The recommendations of the Committee are now under consideration.

5.8 Committee for drawing up a preparatory plan for setting up a Centre for higher research and training in the field of Soil Mechanics and Foundation Engineering

With the increased tempo of construction works under the Plans, the subject of Soil Mechanics and Foundation Engineering has assumed great importance in recent times. It was considered necessary that a Centre for higher research and training in the field should be set up. A committee was appointed to study the matter, and to submit a preparatory plan for the proposed Centre. The Committee has, in its report, recognised the necessity for setting up of the Centre and has recommended that it may, to begin with, be established as a part of the Central Soil Mechanics Research Station of the Central Water and Power Commission. The proposed Centre will engage itself in fundamental and applied research, training and documentation of literature, in the field of Soil Mechanics and Foundation Engineering. Action to implement the recommendations made by the Committee has been initiated.

5.9 Narmada Water Resources Development Committee

The Committee which was headed by Dr. A. N. Khosla, Governor of Orissa, submitted its report on the 1st September, 1965. Copies of the report were forwarded to the concerned States. Comments of the Governments of Madhya Pradesh, Gujarat and Rajasthan have been received. The comments of the Government of Maharashtra are awaited.

5.10 Meetings of the Ministers incharge of Electricity, Chairmen of State Electricity Boards and Chief Engineers of the Southern and Northern Regions

A meeting with Ministers incharge of Electricity and Chairmen and Chief Engineers of the State Electricity Boards of the Southern Region was convened by the Minister of State for Irrigation and Power on the 25th July, 1965, at Bangalore. A similar meeting for the Northern Region was held at Delhi on the 30th July, 1965. The various problems of power development in these regions were considered and the following decisions were taken :—

(i) It was agreed that planning for power development including preliminary investigations on inter-State rivers should be done by the Centre, detailed investigations and execution being left to the State authorities.

As regards transmission lines, it was agreed that the Regional Electricity Boards would be the best agency to co-ordinate the programmes for all inter-State transmission lines.

(ii) As regards design standardisation, it was agreed that transmission line tower designs would be standardised by the CW&PC in consultation with the States. There should be specialised Central units for erection of large power stations and for major repairs and adjustments, while actual operation should be done by the State Boards.

5.11 Meetings with Members of Parliament

Three meetings of the Informal Consultative Committee of the Ministry were held upto the 17th March, 1966.

The Minister of State for Irrigation and Power also held meetings with Members of Parliament from Madhya Pradesh and Kerala, to discuss irrigation, power and flood control problems and the progress of execution of schemes in the respective States.

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CHAPTER VI

IMPORTANT PROJECTS

IRRIGATION AND MULTIPURPOSE PROJECTS

ANDHRA PRADESH

6.1 Nagarjunasagar Project

The project consists of a masonry dam across the river Krishna and two canals, one on each side of the river. The Right Bank Canal will be 216 km long and the Left Bank Canal 173 km. It is expected that an area of 8.34 lakh hectares will be irrigated by the end of the Fourth Plan. The Dam is of stone masonry, with an average height of 90.6 metres above the foundation level.

In terms of total work-load, nearly 82.9% of the masonry and concrete for the dam has been laid and 63.2% of the earth work has been done. The Dam has reached the height of about 43 metres in the spillway portion and about 79 metres in the flanks above the average ground level. The excavation of the tunnels on either side has more or less been completed. Full lining of the left tunnel as well as 83% of the work of lining of the right tunnel has been completed. The major aqueduct across river Halia has been completed while construction of the four other major aqueducts, *viz.* Naidamanoor, Vempalli, Musi and Chinnapalair, is in progress.

Cost of the Project and expenditure incurred.

The sanctioned estimate of the project is Rs. 91.12 crores. A revised estimate of Rs. 139.53 crores has been received from the Government of Andhra Pradesh and is being examined. The expenditure on the project up to the end of December, 1965, totalled Rs. 97.78 crores.

A provision of Rs. 50 crores was made for this project in the Third Five Year Plan. Loans sanctioned during the first four years of the Plan amounted to Rs. 44.50 crores. Rs. 10 crores were provided for the year 1965-66. But in order to create an irrigation potential of 2.34 lakh hectares by 1966, with the object of increasing food production in the first two years of the Fourth Plan, the Andhra Pradesh Government sought additional Central assistance and an amount of Rs. 10.00 crores has been sanctioned during 1965-66 in addition to Rs. 10.00 crores provided in the budget. The project is due for completion in 1970-71.

BIHAR

6.2 Gandak Project

The Gandak Project is primarily an irrigation project, though a small quantum of power will also be generated. It is an inter-State project in which Bihar and Uttar Pradesh are participating. Pursuant to the agreement signed with His Majesty's Government of Nepal on 4th December 1959, Nepal would also derive irrigation and power benefits from the project.

The Project comprises :

(i) A 743 metre long barrage with a road-bridge across the Gandak at Bhaisalotan in Bihar.

(ii) Main Western Canal to irrigate 4.84 lakh hectares in the Saran district of Bihar and about 3.44 lakh hectares in the Gorakhpur and Deoria districts of Uttar Pradesh. A separate canal taking off from the Western bank to irrigate 16,605 hectares in the Bhairawa district of Western Nepal.

(iii) Main Eastern Canal to irrigate 6.03 lakh hectares in the Champaran, Muzaffarpur and Darbhanga districts of Bihar and 0.42 lakh hectares in Parasi, Bara and Rautahat districts of Nepal.

(iv) A power house with an installed capacity of 15 MW at the 14th km of the Main Western Canal in Nepal territory. (This power house will be handed over to Nepal as a gift when the connected load in Nepal has developed to a firm potential of 10 MW at 60 per cent load factor).

The work, including the excavation of all the four canals, is in progress.

The estimated cost of the project is about Rs. 111.38 crores, out of which Bihar's share is estimated to be Rs. 94.92 crores and of Uttar Pradesh, Rs. 16.46 crore. Up to the end of September, 1965 an expenditure of about Rs. 13.25 crores has been incurred on the Bihar portion of the project and Rs. 4.33 crores on the Uttar Pradesh portion. Besides the provision of Rs. 4 crores (Rs. 3 crores as loan assistance and Rs. 1 crore as grant for Nepal works) additional assistance of Rs. 50 lakhs has been provided to the Government of Bihar during 1965-66 for accelerating work on the project which is expected to be completed during the Fourth Plan. Provision has also been made for Central loan assistance to the Uttar Pradesh Government during 1965-66 to the extent of Rs. 2.5 crores.

6.3 Kosi Project

The Kosi Project is a multipurpose project with emphasis on irrigation and flood control. It consists of the following :—

Unit I : Kosi Barrage and Headworks.

Unit II : Flood embankments 240 km long and other protective works.

Unit III : Eastern Kosi Canal System.

The Barrage has been completed in all respects and was inaugurated by His Majesty the King of Nepal on the 24th April, 1965.

Flood Embankments and Protection Measures

The work of construction of about 240 km length of flood embankments on the Eastern and Western banks of the Kosi was completed in 1959. The flood embankments have freed an area of about 20,720 sq km in Bihar and Nepal from the ravages of the Kosi and afforded direct protection to about 0.606 lakh hectares of cultivable land in Nepal and 2.02 lakh hectares of land in Bihar from recurring submergence.

Eastern Kosi Canal System

Earthwork on the entire Eastern Kosi Canal System has almost been completed. Out of 1,877 canal structures, work on 1,776 has been completed. Excavation of water courses up to 2 cusecs capacity is in progress. On completion, the project is expected to provide annual irrigation to the extent of 5.793 lakh hectares of land in the districts of Purnea and Saharsa. Water was released for irrigation in these districts through the completed portion of the Canal system on the 9th July, 1964. An area of 4,100 hectares of land was irrigated during the *kharif* season of 1965. Expenditure incurred on the project up to the end of October, 1965, was Rs. 58.06 crores, against the revised estimated cost of Rs. 64.23 crores.

In addition, Stage II of the project, which consists of the Kosi Power House, the Western Kosi Canal, the extension of the Eastern Kosi Canal and the extension of flood embankments is also under execution. The progress of these works is indicated below :

(i) *Kosi Power House* : A power station with an installed capacity of 20 MW (four units of 5 MW each) at R.D. 12 of the Eastern Kosi Canal, along with connected transmission lines, at an estimated cost of Rs. 2.78 crores, is under construction. Half of the power generated at the power house will be supplied to Nepal and the other half will be available for use in Bihar. The design of the power house has been finalised by the Central Water & Power Commission. The main items of plant and equipment have been transported to the work site. Some auxiliary equipment for erection has also been received. Work on the erection of the main plant is in progress. Work on the out-door sub-station has been started. Orders for sub-station equipment have been placed. The construction of the power fall and a second by-pass channel at the site of the power fall is in progress.

(ii) *Western Kosi Canal* : This scheme, approved for Rs. 13.49 crores, comprises the construction of a main canal 112 km long taking off from the right flank of the Kosi Barrange and will irrigate 3.123 lakh hectares of land in Darbhanga district of Bihar and an area of 12,120 hectares of land in the Saptari district of Nepal. The Prime Minister of India inaugurated the excavation of the canal in the presence of His Majesty, the King of Nepal on the 24th April, 1965. Work on this canal will be taken up after His Majesty's Government of Nepal have given possession of land in Nepal territory. Only preliminary works like construction of buildings etc. have been undertaken so far.

(iii) *Extension of Eastern Kosi Canal* : This scheme is estimated to cost about Rs. 4.67 crores (approved cost) and comprises the construction of a canal system taking off from the Eastern Kosi Main Canal to irrigate an area of 1.604 lakh hectares in the Saharsa and Monghyr districts of Bihar. Against a total quantity of 1.51 crore cu m involved, earthwork to the extent of 1.10 crore cu m has been done on the canal, branch canals and distributaries. The scheme is expected to be completed in 1969-70.

(iv) *Extension of Flood Embankments* : The Eastern Flood Embankment is being extended in a length of 25.76 km from Maina to Koparia. About 90% of the work has been completed. The extension of the Western Flood Embankment in a length of 4.0 km has already been completed. The extension of the flood embankments will afford protection to an area of 15,190 hectares of land in the lower reaches of the river from recurring submergence by floods. The work estimated to cost Rs. 80 lakhs is expected to be completed by 1966.

An expenditure of Rs. 3.08 crores has been incurred on Stage II of the Project up to the end of October, 1965, against the estimated cost of Rs. 21.75 crores.

GUJARAT

6.4 Ukai Project

The Ukai multipurpose Project of Gujarat State envisages the construction of a 70.8 m high Dam on the river Tapi near village Ukai in Surat District, creating a reservoir of 8,511 million cu m capacity. A part of the impounded waters will irrigate annually 0.85 lakh hectares from the Left Bank Canal taking off directly from the reservoir. The rest of the water, after driving the turbines, would run along the river to Kakrapar weir, 88 km downstream. Here, it will be picked up and delivered through the Right Bank Canal to irrigate land in Surat and Broach Districts. This will firm up the irrigation of 2.273 lakh hectares already planned under the Kakrapar canals and increase the perennial irrigation. In addition, it will extend irrigation facilities to a new area of 73,511 hectares coming under the command of the Kakrapar Right Bank Canal. The scheme also envisages the installation of 4 units of 40/45 MW each.

Preliminary works such as construction of quarters, office buildings, laboratories, workshops, approach roads etc. have been completed. The Project is to be completed in the Fifth Plan.

Cost of the Project and Expenditure

The cost of the project, as sanctioned, amounts to Rs. 58.21 crores. The estimates have, however, been revised to Rs. 61.20 crores by the Gujarat Government who have accorded administrative approval to the revised estimate of Rs. 61.20 crores. The total expenditure incurred up to October, 1965 was about Rs. 8 crores.

MADHYA PRADESH

6.5 Tawa Project

The Project envisages the construction of a reservoir across the Tawa river (a tributary of the Narmada river) about half a mile downstream of its confluence with its tributary Denwa in Hoshangabad district and canal systems on both banks. The Project is expected to irrigate a total area of 7.65 lakh acres (0.31 million hectares) and have an installed capacity of 42 MW.

Progress of work

The excavation for foundations of right transition and keywall is complete and in the spillway portion for the last four blocks on the right side, the work is in progress. On the left side, excavation for transition and keywall is nearly complete. River diversion and coffer dam work is 60% complete and the balance of the work is proposed to be completed during the current year. Consolidation grouting on the right transition portion is 50% over. Core drilling work also is in progress in the river portion. Excavation for cut-off trench is nearly complete in the left earth dam and is 40% over on the right side. The cut-off trench in saddle No. II including filter blanket and boulder toes is complete. No work has been done on saddle No. I so far. Nearly 75% of the buildings at the dam site as

well as those provided along the canal line are complete and no further building work is being taken up.

Cost of the Project and Expenditure

The Project was sanctioned by the Planning Commission for Rs. 27.10 crores. The revised cost is expected to be of the order of about Rs. 48 crores. The expenditure up to the end of March, 1966 is estimated at about Rs. 425 lakhs.

MAHARASHTRA

6.6 Jayakwadi Project

The Jayakwadi Project across the river Godavari consists of a dam 36.5 metres (120 ft.) high near Paithan and a left bank canal 185 km (115 miles) long. This will irrigate an area of 1.42 lakh hectares (3.50 lakh acres). The work on the project was inaugurated by the late Prime Minister on the 18th October, 1965. The scheme is estimated to cost Rs. 38.46 crores.

MYSORE

6.7 Tungabhadra Project

The Project, which is a joint venture of the Governments of Andhra Pradesh and Mysore, consists of a masonry dam across the Tungabhadra, a 203 km long canal called the Left Bank Canal with a Power House on the left side, a 347 km long canal called the Low Level Canal with two Power Houses on the right side and a 195 km High Level Canal also on the right side. On completion, the Project will irrigate 4,08,669 hectares of land in the two States of Andhra Pradesh and Mysore, and generate 1,08,000 kW of power.

The following components of the Project have been completed :—

(a) The main dam.

(b) The two Power Houses on the right side (at the toe of the dam and at Hampi) each containing four units of 9,000 kW each.

(c) The Low Level Canal including 22.9 km long Power Channel and its major distributaries.

(d) The distribution system and the field channels on the Low Level Canal in Andhra Pradesh and Mysore.

(e) The Left Bank Canal up to 203 km and the distribution system in Mysore.

(f) The Power House on the left side containing three units of 9,000 kW each.

Works in various reaches beyond 203 km of the Left Bank Canal are in progress.

Under the Low Level Canal, irrigation potential has been created and utilised in full. The total area to be irrigated under the Left Bank Canal is 2.34 lakh hectares.

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Works in various reaches beyond 203 km of the Left Bank Canal are in progress.

Under the Low Level Canal, irrigation potential has been created and utilised in full. The total area to be irrigated under the Left Bank Canal is 2.34 lakh hectares.

The first stage of the construction of the Tungabhadra High Level Canal Scheme, estimated to cost Rs. 13 crores was sanctioned in April, 1959. The works relating to this Scheme are divided into three categories viz., (i) the common works to be executed by the Tungabhadra Board (*i.e.* main canal from head to 110 km); (ii) the works to be executed by the Government of Andhra Pradesh (*i.e.* main canal from 110 km to 195 km and distributaries in this reach); and (iii) the works to be executed by the Government of Mysore (*i.e.* distributaries from head to 110 km). The construction of the canal is in progress. On the common portion of the works under the Tungabhadra Board, earthwork to the extent of 103.80 million cu m has been completed up to end of October, 1965. Out of 154 masonry works, work on 86 has been completed and work is in progress on another 50. The tunnel and its lining have been completed. The construction of all the bridges has been completed. Up to the end of October, 1965, an expenditure of Rs. 778.70 lakhs was incurred by the Tungabhadra Board on the common portion of the High Level Canal Scheme—Stage I. Survey on works relating to the construction of distributaries in Mysore is in progress. The works on this scheme in Andhra Pradesh are also in full swing. On the main canal, 90% of the earthwork and 70% of the embankment work have been completed. The entire substructure of Chinna Hagari Aqueduct has been completed, and 14 out of 26 spans have been concreted. Out of 40 spans on the Pedda Hagari Aqueduct, 27 spans have been completed. 85% of the earthwork on the Uravakonda deep cut has been completed. The Mid Pennar Dam in so far as it pertains to Stage I, the Mid Pennar North Canal and the first 32.20 km of the Mid Pennar South Canal have been completed. The localisation for the entire ayacut has been completed and laying of distributaries and field channels is in progress. An expenditure of Rs. 880.81 lakhs was incurred by the Government of Andhra Pradesh on the exclusive works up to end of October, 1965. With a view to accelerating the creation of irrigation potential *i.e.* 41,000 hectares by July, 1966 and 0.48 lakh hectares by the end of the first year of the Fourth Plan, the Central Government have sanctioned additional financial assistance to the tune of Rs. 1.25 crores and 1.6 crores to the State Government during 1964-65 and 1965-66 respectively, for the early execution of the Scheme. The estimated cost of the scheme is under revision and the revised estimated cost is likely to be Rs. 20.31 crores as against the sanctioned estimated cost of Rs. 13 crores.

The total installed capacity of the Tungabhadra Hydroelectric System is 99 MW at present—72 MW from the two Power Houses under the Tungabhadra Board and 27 MW from the Left Bank Power House under the Government of Mysore.

ORISSA

6.8 Hirakud Dam Project

Stage I : Stage I of the Hirakud Dam Project has been completed in all respects and is being operated and maintained by the Government of Orissa from the 1st April, 1960. Facilities for irrigation were provided for the entire ayacut of 1.55 lakh hectares by the end of October, 1960. The actual utilisation so far has gone up to 1.31 lakh hectares during *Kharif* season and 0.73 lakh hectares during *Rabi* season.

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Due to drought conditions in Orissa during this year, there has been less inflow of water in the Hirakud Reservoir. It is proposed to regulate the water supplies so as to give priority for irrigation over power this year, with a view to intensifying cultivation, which is very essential in the present difficult food situation.

Against the latest revised estimated cost of Rs. 67.81 crores, the expenditure incurred up to the end of 1964-65 was Rs. 65.56 crores.

Stage II : Stage II of the Hirakud Dam Project comprises the augmentation of Hirakud Main Power House at Burla by installation of two more generating units of 37.5 MW each (units 5 and 6) and construction of Chiplima Power House with 3 generating units of 24 MW each. All the generating units under the project have been installed and were put into commercial service by September, 1963. The work on the project has almost been completed, except for the erection of synchronous condensers at Rourkela, orders for which have been placed with M/s Komplex, Budapest.

Against the estimated cost of Rs. 1,496 lakhs, an expenditure of Rs. 1,369 lakhs was incurred up to the end of 1964-65 on Stage II of the Project. An expenditure of Rs. 22.93 lakhs is expected to be incurred on the project during 1965-66.

With the completion of Stage II, the total installed capacity at the Main Power House is 198 MW and at Chiplima Power House is 72 MW and the overall installed capaacity at the Hirakud Dam Project is 270 MW. Both the power houses are meeting the needs of industries in Orissa.

6.9 Mahanadi Delta Irrigation Scheme

The Mahanadi Delta Irrigation Scheme is being executed by the Government of Orissa as an adjunct to Stage I of the Hirakud Dam Project, at an estimated cost of Rs. 34.34 crores.

It consists of a diversion weir at Mundali to pick up the regulated releases from Hirakud and remodelling of the existing canal system and weirs on the Mahanadi and Birupa rivers. On completion, it will irrigate a gross area of 6.5 lakh hectares of land (including the existing area of 0.82 lakh hectares) in the Cuttack and Puri districts. The diversion weir at Mundali and canals have already been completed and an irrigation potential of 2.32 lakh hectares was created by June, 1965. The project is likely to be completed in all respects by 1969-70.

PUNJAB

6.10 Beas Project

A joint venture of the Governments of the Punjab and Rajasthan, the project consists of two units *viz.*, Unit No. I, Beas-Sutlej Link, and Unit No. II, Beas Dam at Pong.

Unit No. I (Beas Sutlej Link)

This scheme envisages the diversion of the Beas water into the Sutlej to avail of the 305 metres fall *en route* at Dehar (Tail of the Link) and another 122 metres fall at Bhakra for generation of hydro-power and to

enable extension of irrigation to the arid tracts in South and South-West Punjab. The project report provides for a diversion dam at Pandoh, 64 metres in height; a combination of tunnels and an open power channel. Dehar Power Plant, to be located near Dehar village, will have 4 units of 165 MW capacity each, giving a total installed capacity of 660 MW. The total installed capacity under the whole Beas Project complex would be 1,019 MW as under :—

Dehar Power Plant, 4 Units of 165 MW each	660 MW
Pong Dam Power Plant, 4 Units of 60 MW each	240 MW
5th Unit at Bhakra Right Bank Power House	119 MW
TOTAL	1,019 MW

In addition, provision is being made for later installation of 2 additional units of 165 MW at Dehar Power House and another 2 units of 60 MW each at Pong Dam Power House. These additional units are not covered in the present project reports and will be covered by a separate project.

This project will provide irrigation to a culturable commanded area of 5.25 lakh hectares and the annual irrigation will be of the order of 3.24 lakh hectares. The scheme has been accepted at a total estimated cost of Rs. 96.67 crores. The work of investigations, surveys, geological exploration, acquisition of land, widening of roads, construction of workshops and bridges is in progress. The work on this Unit was started in 1962. It is proceeding according to the revised construction schedule and is likely to be completed by the end of 1971-72.

Unit No. II (Pong Dam)

The site for the dam is located near Pong village about 24 miles from Mukerian. It will be an earth-*cum*-rockfill dam rising 116 metres above the river bed. With the reservoir primarily intended for storing water for the Rajasthan Canal, the Project will ensure extension of perennial irrigation in the Punjab and Rajasthan. A power Plant with an installed capacity of 240 MW will also be constructed here, giving firm power of 75 MW at 100% load factor. The Unit is expected to cost about Rs. 111 crores. Construction of Beas Dam at Pong is in a relatively advanced stage. Besides preliminary works, major works on construction of the Dam and appurtenant works have been taken in hand. Out of the five diversion tunnels, two have been completed and the other three are nearing completion. The excavation of these tunnels in a total length of 16,000 feet has been completed. Concreting of two of the diversion tunnels is in progress. The excavation of the right and left abutments and spillway channel is progressing satisfactorily. Concreting of Stilling Basin, and work on the rail link between Talwara and the dam site are also in progress. The dam was scheduled to be completed by 1970-71; but it is likely to be delayed due to the tight position of resources and scarcity of foreign exchange.

Provision of Funds for the Project (Units I & II)

A total expenditure of Rs. 42.44 crores was incurred on both the units up to the end of September, 1965 against the Third Plan provision of Rs. 52.61 crores.

The foreign exchange requirements of the Project are planned to be met partly from a loan of $33 million from USAID and partly from another loan of $ 23 million from the International Bank of Reconstruction and Development. These loans are under negotiation.

6.11 Bhakra Nangal Project

The 740 feet high Bhakra Dam was completed and dedicated to the Nation on the 22nd October, 1963. All works relating to the dam and the left bank power plant were completed during 1964-65. Some works relating to Right Bank Power Plant and extensions and improvements in the grouting and drainage of dam foundations, spillway repairs, building of monuments, tourist facilities, plantations etc., are likely to continue during the Fourth Plan.

The year 1965-66 was the driest year on record. As a result, the quantum of water stored was much less than that planned. Due to less storage in the reservoir, releases were made from it to serve the best interests of both irrigation and power generation.

The installed capacity of the power plant of the project is 604 MW, shared between Punjab and Rajasthan in the ratio of 84.78 : 15.22 after meeting the requirements of Delhi, Nangal Fertiliser Factory and Himachal Pradesh.

6.12 Bhakra Right Bank Power Project

The Bhakra Right Bank Power Project, although approved for execution as a separate scheme, is actually an adjunct of the Main Bhakra-Nangal Project. The construction of the following works is in progress :

1. Power House at the right bank with 5 generating units of 120 MW each, with the necessary auxiliaries, step-up stations etc. The installation of the 5th Unit is actually covered under Unit I of the Beas Project;
2. 915 m of 220 kV double circuit transmission line for interconnecting the Left Bank and Right Bank Power Houses;
3. 456 km of 220 kV single-circuit transmission line from Bhakra to Delhi *via* Sangrur and Hissar and the necessary sub-stations;
4. 278 km of 132 kV single-circuit transmission lines and sub-stations; and
5. 70 km of doublt-circuit and 187 km of single-circuit 66 kV transmision lines and sub-stations.

The sanctioned estimate of the Project is Rs. 26.43 crores excluding Rs. 8.92 crores as the cost of common works forming part of the cost of the Bhakra-Nangal Project. According to the revised estimates, the cost of the project is likely to rise to Rs. 59.32 crores.

The ultimate installed capacity at the Right Bank Power House will be 600 MW. The first generating unit of 70/120 MW is expected to be commissioned in March, 1966 and the subsequent units at intervals of 3 months each. The power produced will be utilised to meet the requirements of the Punjab and Rajasthan as also of Delhi, Jammu & Kashmir, and Himachal Pradesh.

The plant and equipment for the Power House is being imported from U.S.S.R. under an agreement between the Government of India and the Government of U.S.S.R. The main civil works on this Project have been completed.

It is anticipated that an expenditure of Rs. 18.9 crores would be incurred on the project up to the end of the Third Plan.

RAJASTHAN

6.13 Chambal Project

The multipurpose Chambal Project is being jointly executed by the Madhya Pradesh and Rajasthan Governments, who share its benefits and cost equally. On completion, the Project will produce 2,30,000 kW of power at 60% load factor and irrigate 5.66 lakh hectares of land. The Project will be completed in three stages.

Stage I of the Project consists of the construction of Gandhi Sagar Dam, a Power House at the foot of the dam with 5 units of 23,000 kW each (4 units in Stage I and the 5th in Stage II), transmission lines, Kotah Barrage, and irrigation canal system in both the States. It will produce 80,000 kW of power at 60% load factor and irrigate 4.44 lakh hectares of land in both the participating States.

Stage II of the Project envisages the construction of a masonry dam on the main river (Rana Pratap Sagar Dam), a Saddle Dam across Padajhar Valley on the left flank and a power station with 4 units of 43,000 kW each below the Rana Pratap Sagar Dam, with suitable transmission lines and Grid Sub-Station. On completion of this stage, 90,000 kW of power at 60% load factor would be generated and irrigation facilities to an area of 1.21 lakh hectares would be provided.

Stage III includes the construction of Kotah Dam (renamed as Jawahar Sagar Dam) and a power station at its toe, situated about 24 kilometres below the Rana Pratap Sagar Dam. The power station will have 3 units of 33,000 kW each with provision for the installation of a fourth unit at a later date. On completion, it will produce 60,000 kW of power at 60% load factor.

The progress on the principal works is given below :—

Stage I.

The Gandhi Sagar Dam and the Kotah Barrage have been completed. In the Gandhi Sagar Power Station, four units of 23,000 kW each have been installed. Work on the installation of the 5th Unit is in progress. Both in Madhya Pradesh and Rajasthan, all the transmission lines and Grid Sub-Stations have been completed. In Madhya Pradesh, the Main Canal—Upper, the Main Canal—Lower and the first 56 km of the Ambah Branch Canal, have been completed. Earthwork on the Morena Branch Canal from head to mile 24 is practically complete. The works on the Distribution System and Water courses are progressing well. The irrigation potential created up to the end of October, 1965, was 0.69 lakh hectares. It is anticipated that irrigation potential to the extent of 1.845 lakh hectares would be created by the end of the Third Plan and of 2.62 lakh hectares by March, 1967 and the full potential of 2.825 lakh hectares by December, 1967. In Rajasthan, the main canals on both sides have been

completed. Out of a total length of 2,731 km of canals and distributaries, works on a length of 2,483 km have been completed in all essential details, thereby creating an irrigation potential of 1.6 lakh hectares by March, 1965, against which the actual utilisation was 0.814 lakh hectares.

Against the sanctioned estimate of Rs. 63.59 crores for Stage I, the expenditure incurred up to the end of November, 1965 was Rs. 65.62 crores. The estimates are currently under revision and are likely to go up to Rs. 70.76 crores.

Stage II (Rana Pratap Sagar Dam and appurtenant works including Power House).

Work on the Main Dam, such as rock-cutting, curtain grouting, masonry and concreting is being continued. Up to the end of October, 1965, rock-cutting and concreting have been nearly completed, while 88.69% of masonry work has been completed. On the Power House and Tail Race, excavation work in the Open Cut (Surge Basin) and tunnel is in progress. About 3.2 lakh cu m of rock have been excavated and 5,632 cu m lining in the tunnel was done up to the end of October, 1965. Work on the Saddle Dam also remained in progress. Construction of colony buildings at the dam site has been completed. On the power sector of Stage II, alignment and levelling of most of the transmission lines is nearing completion. Drawings for transmission line towers have been scrutinized and approval/comments communicated to the firms.

An expenditure of Rs. 12.94 crores was incurred up to the end of November, 1965 against the revised estimated cost of Rs. 24.39 crores. The estimates are being revised to Rs. 30.62 crores.

Stage III (Jawahar Sagar Dam).

Work on the construction of II-Stage Diversion Tunnel and Coffer Dam, and excavation of the dam foundation, Power House and Surge Basin area and Tail Race is in progress. Drawings received from Canadian suppliers/ Manufacturers of Plant and Equipment for Jawahar Sagar Power Station have been examined and approval/comments sent to them. Construction of essential residential and non-residential buildings has practically been completed. Stage III works are likely to be completed by the end of 1968.

Up to the end of November, 1965, an expenditure of Rs. 1.76 crores was incurred, against the estimated cost of Rs. 9.67 crores. The revised estimate of Stage III, amounting to Rs. 13.54 crores, is still to be approved by the Planning Commission.

6.14 Rajasthan Canal Project

The Rajasthan Canal is proposed to be completed in two stages : Stage I, which is expected to be completed by 1969-70, comprises the construction of the Rajasthan Feeder, Rajasthan Main Canal up to 196.42 km and branches and distributaries taking off in this reach. The Main Canal below mile 196.42 km and all its off-taking channels will be constructed in Stage II which may be completed sometime after 1977.

The portion of the Rajasthan Feeder in Punjab was completed and water let therein on the 1st July, 1964. With its completion, all works (excavation as well as lining) in the first 215.74 km length of Feeder and 41.86 km length of the Main Canal have been completed. As against the

estimated quantity of 75.59 million cu m of earthwork and 196.10 km of lining on the Main Canal in the first Phase. 28.53 million cu m of earth-work and 43.82 km of lining have been done. On the Distribution System, in the first 77.28 km reach of the Main Canal, a total excavation of 25.83 million cu m has been completed against a total work-load of 74.48 million cu m.

The Rajasthan Canal Project, on completion of both the phases, will provide irrigation facilities to an area of 1.16 million hectares annually in the Districts of Ganganagar, Bikaner and Jaisalmer in Rajasthan. The total cost of the project is estimated to be Rs. 184 crores, of which, works in the First Stage of the Project are estimated to cost Rs. 75 crores and in the Second Stage Rs. 64 crores. The share debitable to the Project towards the cost of Pong Dam, Madhopur Beas Link and Harike Barrage is estimated to be Rs. 45 crores.

UTTAR PRADESH

6.15 Ramganga Project

The multipurpose Ramganga River Project in Uttar Pradesh comprises the following items of works :—

Unit I : Dams and appurtenant works

There will be a 123.6 metre high earth and rockfill dam across the river Ramganga near Kalagarh in Garhwal district and a 75.6 metre high saddle dam across the Chuisot stream with connected works. There will also be two diversion tunnels of 10.6 metre diameter each, for diverting the flow of the river during construction period. One of the tunnels will be used, later on, as spillway tunnel and the other one as power tunnel.

Unit II : Irrigation and Drainage works

These consist of :—

(i) a 546 metre long weir across the river Ramganga at Hareoli and connected works; and

(ii) remodelling and extension of irrigation channels of the Lower Ganga Canal, the Agra Canal, the Upper Ganga Canal and the Ramganga Canal Systems.

Unit III : Power Generation works

The scheme provides for a power house on the right bank of the river at the toe of the main dam, having 3 units of 60 MW each.

The execution of the project was taken up in 1956 when preliminary investigations and construction of temporary camp buildings at Dhampur, the railhead for the project and at Kalagarh were started. A prestressed bridge on the Ramganga, near Sherkot, was also started and completed in 1961 with a view to providing an all-weather access road to Kalagarh, the main construction site. Another bridge across the Ramganga river at Kalagarh for access to project site is in an advanced stage of construction. It has been opened for vehicular traffic by providing temporary decking in one lane width. Work on the two tunnels is in progress. Earthwork in stripping at the main dam and the saddle dam is in progress. Construction

of 85% of the residential buildings has been completed. Construction of non-residential buildings has already been completed. The work of remodelling of the Lower Ganga Canal System and construction of irrigation channels on this system is in progress. Through the irrigation channels already constructed, irrigation has been provided for an area of about 1 lakh hectares.

The expenditure on the project up to the end of October, 1965 was Rs. 20.38 crores against the present estimated cost of Rs. 92 crores. The Project is expected to be completed by March, 1972. On completion, the project will irrigate an additional area of 6.90 lakh hectares, generate 165 MW of power and reduce the intensity of floods in central Uttar Pradesh.

WEST BENGAL

6.16 Kangsabati Project

The Project envisages the construction of two independent earthen dams on the river Kangsabati and on Kumari river (a tributary of Kangsabati river), respectively, about a mile upstream of their confluence near Ambikanagar in the Bankura district of West Bengal. The length of the Dam and Dykes is 10.4 km (6.5 miles) and maximum height of the dam above the river bed is 41.15 m (135 ft). The live storage capacity of the reservoir created will be 986.8 million cu m (8.0 million acre feet). Two canals are proposed from the Right and Left Bank Head Regulators to irrigate 3.23 lakh hectares (8.0 lakh acres) of *kharif* and 0.606 lakh hectares (1.5 lakh acres) of *rabi* annually.

The estimated cost of the project is Rs. 25.26 crores and the expenditure up to the end of Third Plan is Rs. 14.87 crores.

An irrigation potential of 48,560 hectares (1.2 lakh acres) has already been created, out of which 29,100 hectares (72,000 acres) were irrigated during the *kharif* of 1965. By the end of the Third Plan it is expected that the potential to be created under this project would be 0.606 lakh hectares (1.5 lakh acres).

DELHI

6.17 Delhi Rural Drainage Scheme

The work on the Najafgarh Drainage Scheme is in progress. The dismantling of the old bridges across the Najafgarh drain has been completed. The important bridges at Basaidhara, Bharat Nagar, Delhi Tail Distributary aqueduct, Roop Nagar, Vijay Nagar, Rajpur Road and Rohtak Road have been completed and work on G.T. Road bridge is in progress. The regulators at Dhasa Bund and Kakraula have been completed. The rest of the works are expected to be completed by June, 1966.

HYDRO-ELECTRIC AND THERMAL PROJECTS

ANDHRA PRADESH

6.18 Kothagudem Thermal Power Station—Stages I & II

The Kothagudem Thermal Power Station, Stage I involves installation of two generating units of 60 MW each. The generating plant and equipment have been procured from Japan. The cooling water required for this

Project is proposed to be supplied from the Kinnersani Dam. The works on the Power Station as well as the Dam are in an advanced stage and it is anticipated that the generating units will be commissioned by April, 1966 and July, 1966 respectively. According to the latest revised estimates, the cost of the Stage I Works including Kinnersani Dam is Rs. 22.93 crores. The expenditure up to the end of March, 1966, is likely to be Rs. 16.95 crores. The Kothagudem Thermal Power Station, Stage II involves extension of the power station by two more generating units of 60 MW each, at an estimated cost of Rs. 10.77 crores. An expenditure amounting to Rs. 2.75 crores is likely to be incurred by the end of March, 1966. This stage is expected to be completed in the latter part of 1966-67.

Stage-I Works are receiving assistance from the International Development Association and the Stage II from the World Bank.

6.19 Ramagundam Thermal Power Station Extension

The Ramagundam Thermal Power Station with an installed generating capacity of 37.5 MW is situated in the Telengana region. The extension project involves installation of a 62.5 MW generating unit. According to the recent revised estimates, the project would cost Rs. 9.5 crores. Orders for the generating plant and major part of the equipment have been placed in U.S.A. and the generating unit is scheduled to be commissioned by the end of 1967. The likely expenditure on this project by the end of March, 1966, is Rs. 3.3 crores.

The Project is being financed under USAID Loan.

ASSAM

6.20 Namrup Thermal Project

The scheme comprises the installation of 3×23 MW Gas Turbine sets at Namrup in the district of Lakhimpur by utilising the natural gas available from the Naharkatiya gas and oil fields. It will meet the power requirements of Upper Assam and the Namrup Fertilizer Factory. The Scheme was originally sanctioned for Rs. 6.08 crores. This has now been revised and is estimated to cost Rs. 8.62 crores. An expenditure of Rs. 809.78 lakhs was incurred up to the end of March, 1965. All the units were commissioned in the first quarter of 1965-66.

A scheme for further expansion of the station by another 2×23 MW gas turbine sets has been accepted, in principle, by the Technical Advisory Committee.

BIHAR

6.21 Pathratu Thermal Power Station

To supply power to the Heavy Engineering Corporation at Hatia and other important industries including coal fields in the neighbouring areas, a thermal power station is being constructed at Pathratu in the district of Hazaribagh. The project provides for installation of 4 generating units of 50 MW each and 2 units of 100 MW each. The total estimated cost of the Project is Rs. 46.97 crores and the Third Plan provision is Rs. 34.07 crores. The plant and equipment is being supplied by USSR under a trade agreement. Some items of the plant and equipment have been received

at site and erection work is in progress. The first unit of 50 MW is expected to be commissioned in March 1966 and the remaining three units are expected to be commissioned in 1966-67. All the works are scheduled for completion in 1967-68.

GUJARAT

6.22 Dhuvaran Thermal Power Station

The project was completed in all respects in July, 1965 and all the four generating units of 62.5 MW each are in commercial operation. The revised estimated cost of the Project is Rs. 30 crores. The Third Plan provision is Rs. 24 crores. Financial assistance was received for this Project from the USAID.

The second stage of the scheme, which provides for the installation of two additional units of 125/140 MW is proposed under the Fourth Plan and advance action involving preliminary works, has already been taken up. The estimated cost of the second stage is Rs. 22.70 crores for generation and Rs. 3.3 crores for transmission.

JAMMU AND KASHMIR

6.23 Lower Jhelum Hydroelectric Project

The project, a run-of-the-river scheme, is located in Baramulla district on the river Jhelum and envisages the generation of power by utilising the waters of the river Jhelum and the natural storages available from Wular lake supplemented by waters from the upstream tributaries. In the first stage, four units of 16 MW each will be installed and three more units of the same capacity will be added later. The estimated cost of the scheme is Rs. 17.45 crores for 112 MW installed capacity. The Third Plan provision is Rs. 2.04 crores. Preliminary works are in progress.

KERALA

6.24 Idikki Project

Preliminary works such as construction of access roads, bridges and buildings are in an advanced stage of construction. Construction of permanent buildings in the colony are progressing satisfactorily. The scheme which was originally estimated to cost Rs. 49.22 crores is now under revision. The State Electricity Board have proposed revision of Stage I works involving installation of three generating units of 130 MW each at a total estimated cost of Rs. 58 crores. The original Third Plan provision was Rs. 3 crores. The anticipated expenditure by March, 1966, is Rs. 5.32 crores.

The project is receiving Canadian Aid in the form of loans to be given on year-wise basis.

MADHYA PRADESH

6.25 Korba Thermal Power Station—Stage II

The project envisages installation of four additional units of 50 MW each in the existing Korba Power House located near Chamba in Bilaspur district. Work on the extension project was taken up in 1961 and is in

good progress. All the four units are expected to be commissioned during the year 1966. The plant and equipment is being supplied by USSR. The revised estimated cost of the scheme is Rs. 26.46 crores. The Third Plan provision is Rs. 19.0 crores.

MADRAS

6.26 Kundah Hydroelectric Project—Stage III

The scheme provides for the installation of the third generating unit of 20 MW in the existing Power House No. I and a 5th unit of 35 MW in Power House No. II which were commissioned in the Second Plan period and one unit of 50 MW and one unit of 20 MW, 2 units of 60 MW each and one unit of 50 MW in three more power stations. The work on the Project is progressing satisfactorily. One unit of 35 MW and one unit of 20 MW were commissioned in the first quarter of 1964 and another unit of 20 MW was commissioned in October, 1964. Two more units of 60 MW each were commissioned in March, 1965 and July, 1965. One unit of 50 MW was commissioned in February 1966.

The revised estimated cost of the Project is Rs. 37.58 crores. The original Third Plan provision was Rs. 23 crores. The expenditure incurred up to the end of August, 1965 was Rs. 24.5 crores.

MAHARASHTRA

6.27 Koyna Hydroelectric Project—Stage II

Work on four generating units of 75 MW each, is simultaneously in progress. The estimated cost of Stage II of the project is Rs. 14.61 crores, the total for Stages I & II being Rs. 52.89 crores. The Third Plan provision for Stage I was Rs. 11.55 crores and that for Stage II Rs. 15.97 crores. The total expenditure incurred on the Project up to the end of June, 1965, was Rs. 46.27 crores.

MYSORE

6.28 Sharavathy Hydroelectric Project

The first stage of this project has been completed. The first unit of 89,100 kW was commissioned in January, 1965, and the second unit in June, 1965.

Work on the second stage of the Project which provides for the installation of six additional units of 89,100 kW is in hand. It is anticipated that these generating units will be commissioned progressively at the rate of two units per year from 1966-67. It is proposed to take up the third and final stage of the project during the Fourth Five Year Plan in which the 9th and the 10th units of similar capacity will be added. The generating units for both Stages I and II are being supplied by U.S.A. under USAID assistance and the turbines by France.

The estimated costs of Stages I, II and III (including 220 kV transmission), as revised, are as follows :—

Stage I	Rs. 58.43 crores
Stage II	Rs. 42.86 crores
Stage III	Rs. 22.24 crores

A total provision of Rs. 42.2 crores (Rs. 22.2 crores for Stage I and Rs. 20 crores for Stage II) was made under the Third Five Year Plan. The expenditure likely to be incurred till March, 1966, is Rs. 36.7 crores.

ORISSA

6.29 Talcher Thermal Power Station

The Scheme comprises the construction of a thermal power station at Talcher with an installed capacity of 250 MW (4 generating units of 62.5 MW each) to utilise the low grade coal available in this area. The Project is being financed from USAID loans. Work was commenced in 1961-62. Turbo generators and boilers, and structural steel, have been received at site and civil engineering and foundation works have been completed. All the generating units are expected to be commissioned during 1966-67. The revised estimated cost of the project is Rs. 30.35 crores. The Third Plan provision is Rs. 26.82 crores against which an expenditure of Rs. 19.93 crores is expected to be incurred by March, 1966.

UTTAR PRADESH

6.30 Obra Thermal Power Station

This scheme comprises a Thermal Power Station with five generating units of 50 MW each (total installed capacity 250 MW) at Obra in Mirzapur district. Orders for the plant and equipment have been placed with U.S.S.R. The civil works on the power station are progressing. It is anticipated that three generating units would be commissioned during 1966-67 and the remaining two during 1967-68. The estimated cost of the Project is Rs. 27.25 crores. The Third Plan provision is Rs. 23 crores against which an expenditure of Rs. 20.29 crores is anticipated to be incurred by March, 1966.

WEST BENGAL

6.31 Bandel Thermal Power Station

The erection of three of the four boilers has been completed and erection of turbo generators is in an advanced stage of progress. The first unit of 75/82.5 MW was commissioned in October, 1965, and the remaining three units will be commissioned shortly. The estimated cost of the scheme is Rs. 32 crores. The Third Plan provision was Rs. 29 crores. An expenditure of Rs. 30.11 crores is likely to be incurred by March, 1966.

The project is being financed by USAID to the tune of 38 million dollars and in addition Rs. 8.4 crores from rupee counterpart funds under PL 480 for meeting the rupee expenditure.

DELHI

6.32 Delhi Electric Supply Undertaking and the Delhi Thermal Project Control Board

The Delhi Electric Supply Undertaking has a number of generating stations, located at various places in Delhi having a total installed capacity of 111.6 MW. In addition to its own installed capacity, the Undertaking is getting 60 MW power from the Bhakra Nangal system. It was also

decided that the Punjab State Electricity Board would supply additional 20 MW of power to the Undertaking on regular basis.

The Indraprastha Power Station Extension Project envisaging installation of 3 units of 50/62.5 MW each, is a joint venture of the Delhi Electric Supply Undertaking and the Government of Punjab. The expenditure is being shared by D.E.S.U. and the Punjab State Electricity Board in the ratio of 2 : 1 as one of the units will be reserved for supply of power to the Punjab. For the efficient, economic and early implementation of the Indraprastha Power Station Extension Project, a Control Board has been set up. The Planning Commission have also approved, in principle, the installation of the 4th unit of 50/62.5 MW at this project. Work is progressing satisfactorily and the first unit is expected to be commissioned by about the middle of 1966-67.

A 15 MW generating unit is being installed as an extension to the existing 'B' Power Station of D.E.S.U. The supply of plant and equipment for the project is covered under the Indo-Hungarian Trade Agreement. Almost all the plant and equipment for the project has been received at site and the work of boiler erection is nearing completion. The plant is expected to be commissioned by the end of March, 1966.

Another thermal power station (300 MW) is proposed to be constructed at Badarpur, about 12 miles from Delhi. The Technical Advisory Committee has accepted this scheme, in principle. The Scheme is proposed to be taken up by the Central Government to meet the power requirements of the Northern Zone.

The Committee, appointed to suggest improvements in the distribution system of both the Delhi Electric Supply Undertaking and the New Delhi Municipal Committee, submitted its report in November, 1965. Copies of the report have been forwarded to Delhi Electric Supply Undertaking and New Delhi Municipal Committee for implementation of the recommendation concerning them.

OTHER PROJECTS

6.33 Farakka Barrage Project

The Farakka Barrage Project is primarily intended to improve the navigability of the Port of Calcutta. The principal components to secure this objective are :—

(i) Construction of a Barrage across the Ganga at Farakka with a rail-cum-road bridge;

(ii) a barrage across the Bhagirathi; and

(iii) a feeder canal tailing into Bhagirathi.

Keeping in view the limitations in regard to the resources for this project during the Fourth Plan period *vis-a-vis* the main objective to be achieved, the project works have been phased as under :—

Unit I—Farakka Barrage with road-cum-rail bridge over it. Head Regulator, Right Afflux Bund, 40% of Right Guide Bundh, Left Guide Bundh, 66% of Left Afflux Bundh, Feeder Canal.

Jangipur Barrage*, Navigation Lock and Bye-Pass Channel at Jangipur Barrage, Bagmari Syphon, Kanoli inlet and other diversion works, Road Bridges over Feeder Canal 2 Nos. (Work on Upstream Lock at Farakka which has already been started has to be suspended after bringing it to a safe stage and the balance works to be taken up under Unit II). These works are to be completed by 1970-71.

Unit II—34% of Left Afflux Bundh, 60% of Right Guide Bundh, Tail Regulator on Bye-Pass Channel, Bye-Pass Channel, Additional bridges over Feeder Canal.

Unit II works are to be taken up after 1970-71, if funds are not available during the Fourth Plan.

Unit III includes the works required for navigation, *viz.* navigation locks, shelter basins, etc. This would be taken up in the Fifth Plan after completion of Unit I works.

The work on the main barrage is in progress on both banks of the river. The work is also in progress on the Feeder Canal.

Procurement of equipment and machinery had posed a big problem but this has largely been overcome. Nearly Rs. 7 crores worth of machinery required for the project has already been procured and the procurement action for the balance is in progress.

The acquisition of land required for the project is being arranged through the West Bengal Government. Nearly 60 to 70% of the total land required for the Barrage and appurtenant works, for the colonies, and for the Feeder Canal, have already been taken possession of.

The expenditure up to the end of the Third Plan is likely to be Rs. 28.5 crores against the sanctioned estimate of Rs. 68.59 crores. The estimate is under revision.

6.34 Trisuli Project (Nepal) under Indian Aid Programme

The first stage of the scheme comprises construction of a diversion weir across the Trisuli river, water conductor system and a power station with the installation of three generating units of 3 MW each. The total cost of the first stage is Rs. 8.64 crores.

The second stage of the scheme provides for completion of the balance civil works for the ultimate development and installation of the fourth generating unit of 3 MW. The estimated cost of the second stage is Rs. 70.22 lakhs.

Under the third Stage of the Project, 3 additional generating units of 3 MW each are proposed to be installed in the Power Station at an estimated cost of Rs. 37.54 lakhs.

The entire cost of the Project is borne by the Government of India, but the foreign exchange required for the project is being made available by the Government of Nepal, and equivalent amount in Rupees against it, is paid to the Government of Nepal by the Government of India. After completion, the project is to be handed over to the Government of Nepal.

*The Navigation Lock and Bye-Pass Channel provided at the Jangipur Barrage are meant to maintain *status quo* of the navigational traffic through the Bhagirathi up the Ganga, during the monsoon months.

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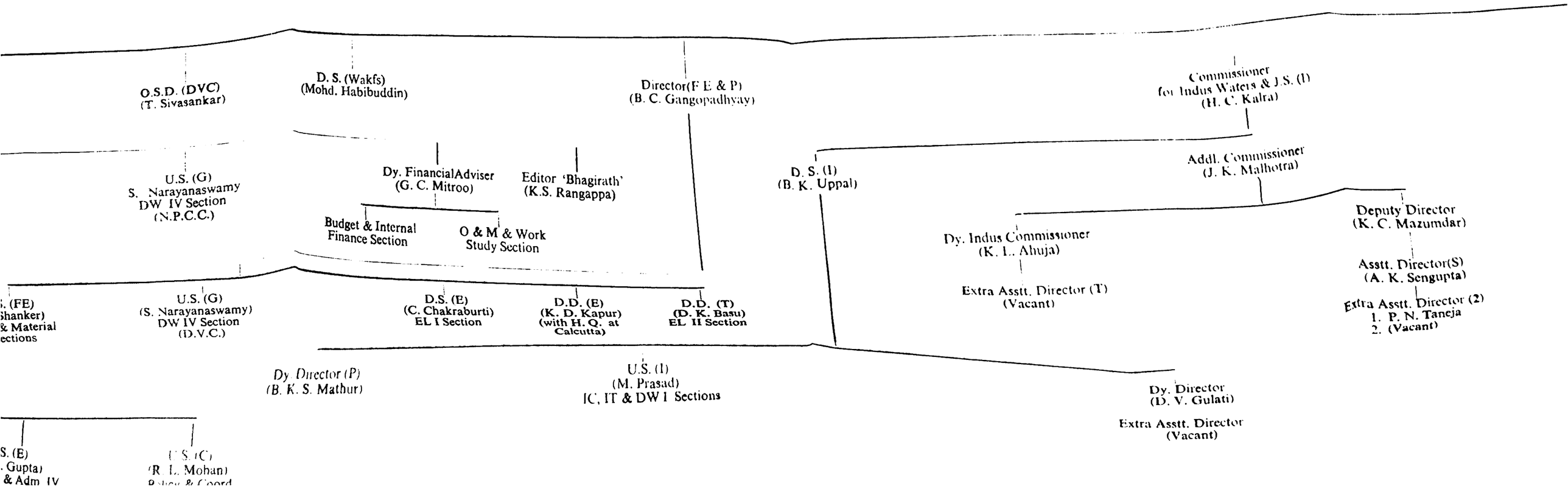

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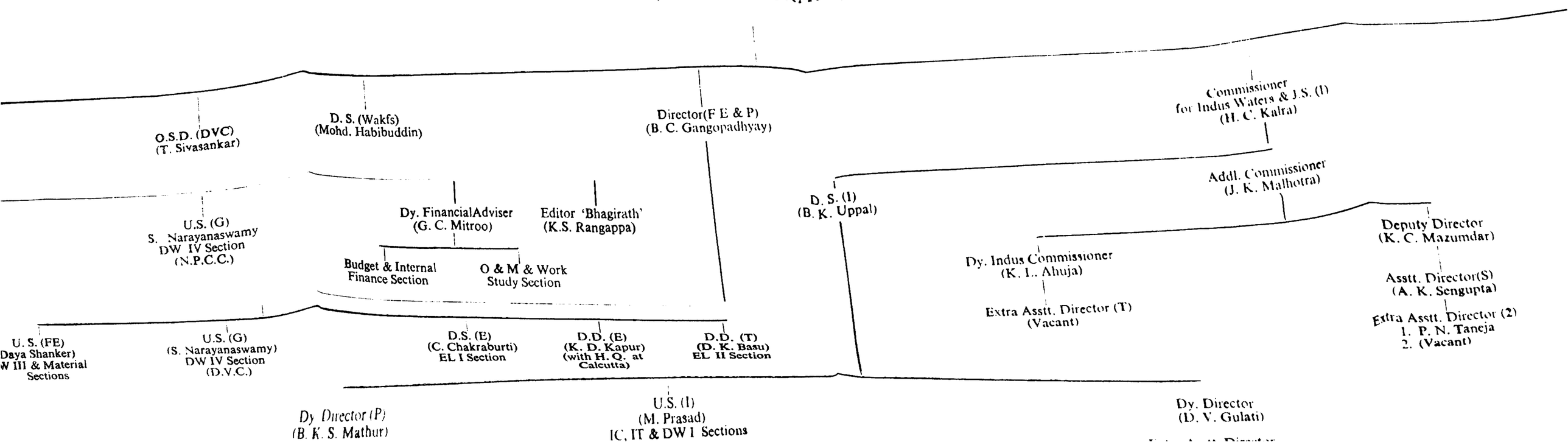

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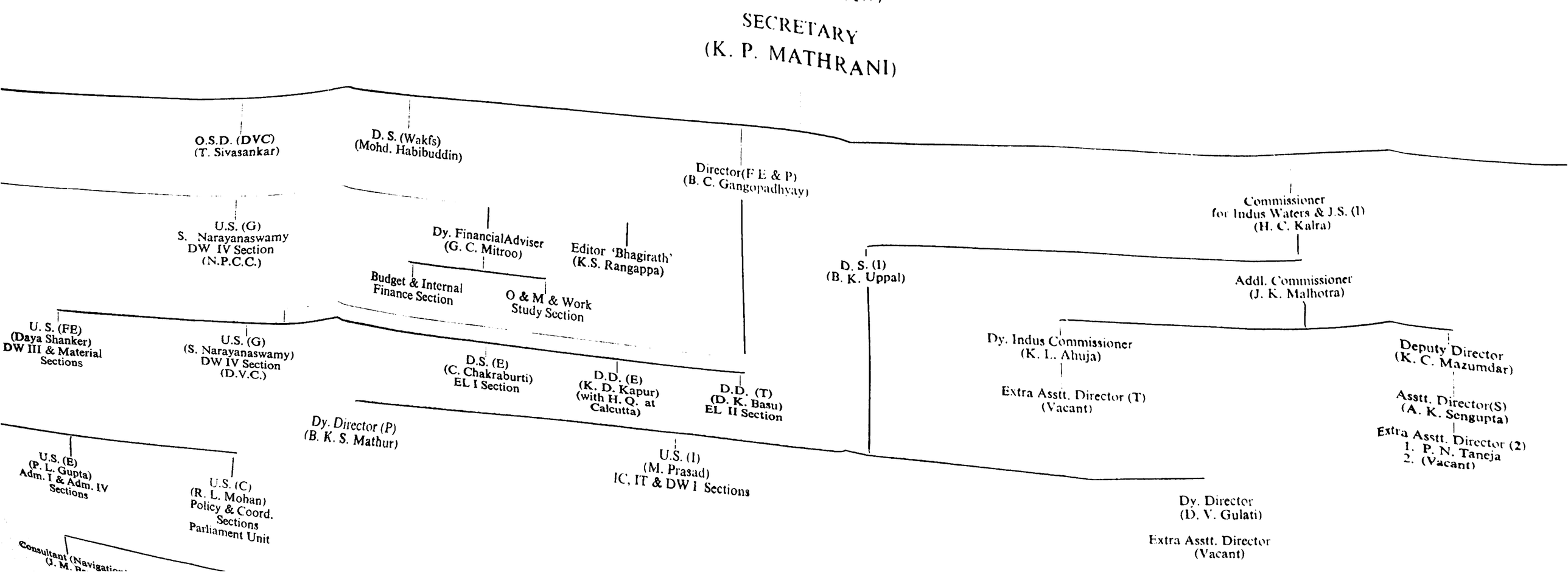

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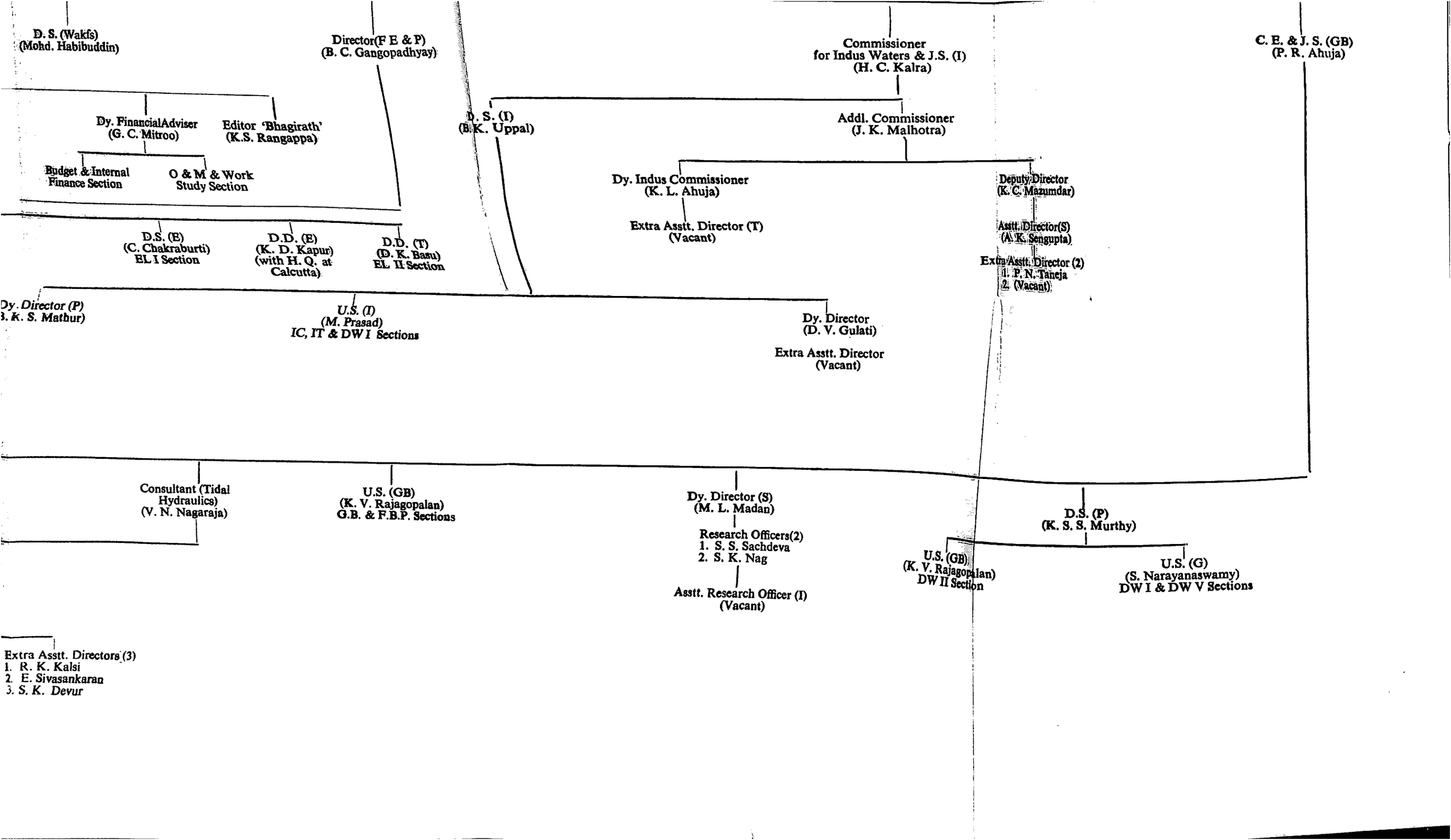
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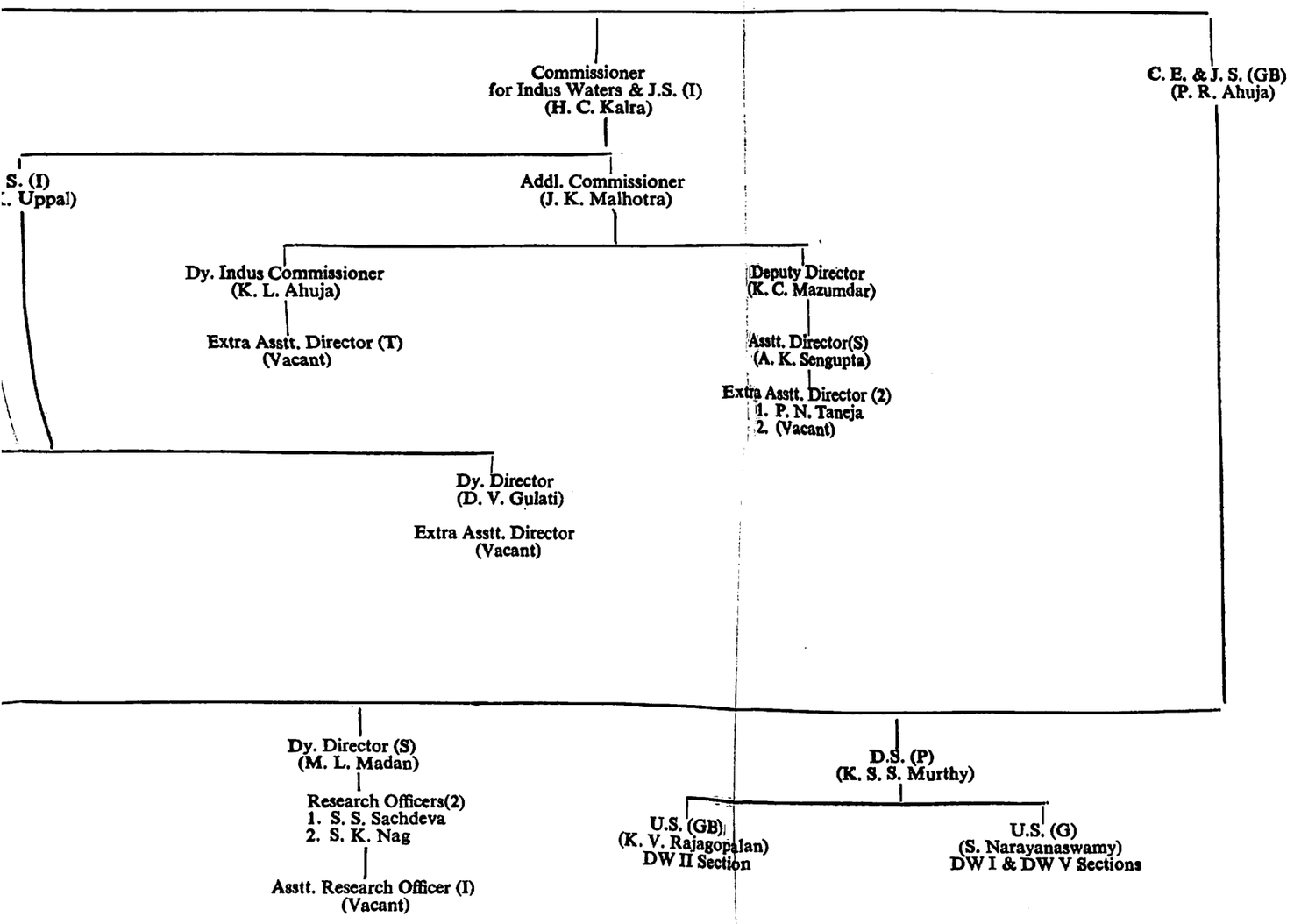

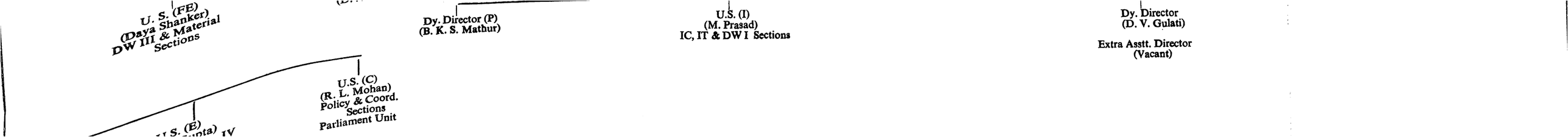
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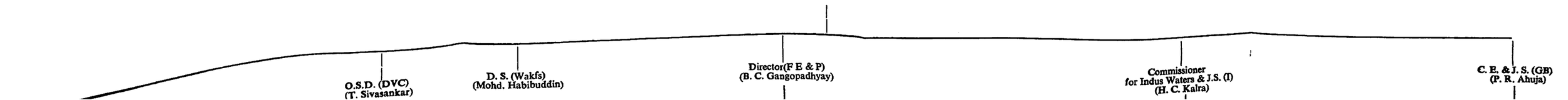

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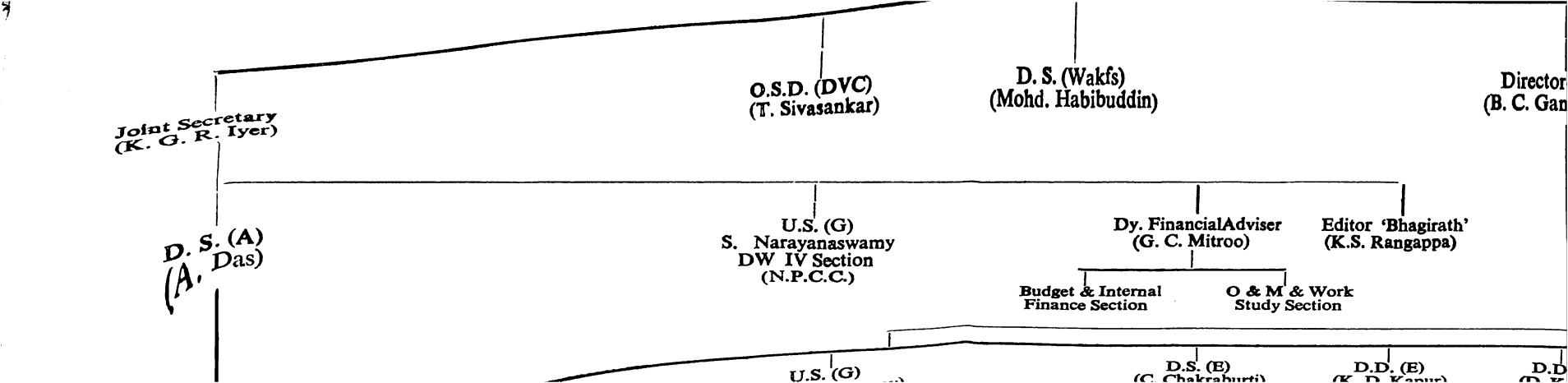
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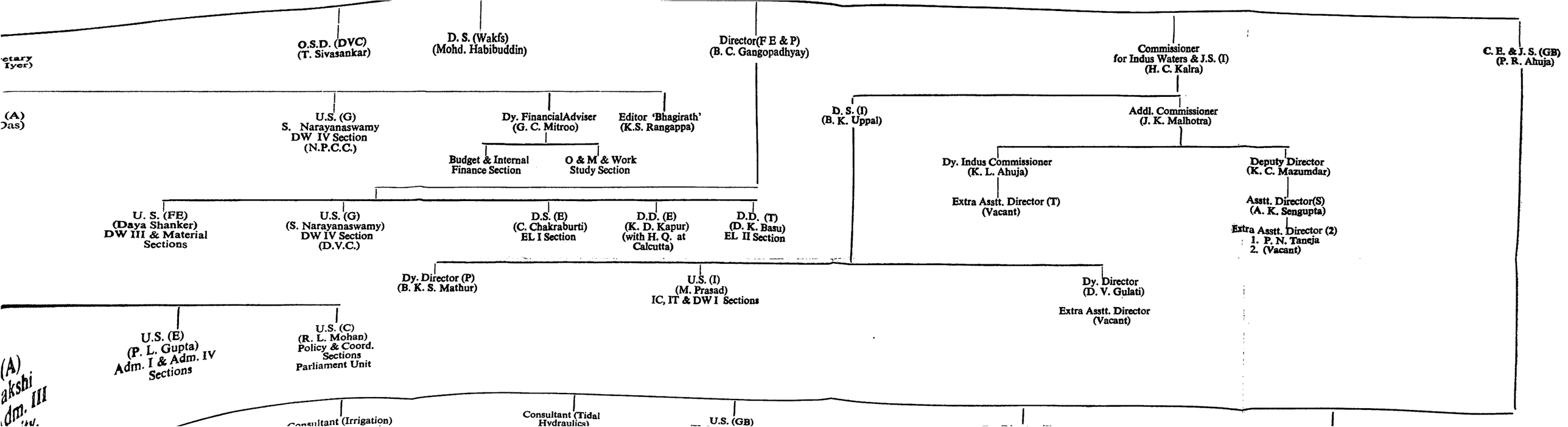
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(T. Sivasankar)
D. S. (Wakfs)
(Mohd. Habibuddin)
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(B. C. Gangopadhyay)
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(K. D. Kapur)
(with H. Q. at
Calcutta)
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Hydraulics)
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AS ON 1-2-1966

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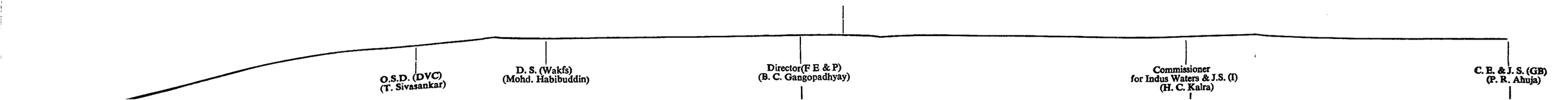
MINISTER OF STATE
(DR. K. L. RAO)

SECRETARY
(K. P. MATHRANI)



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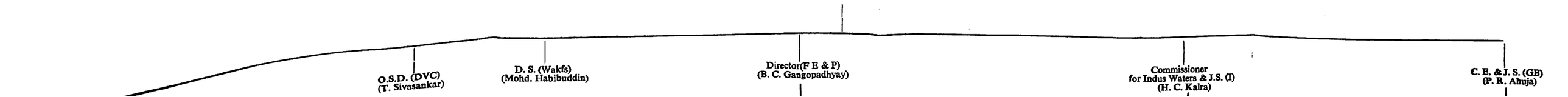

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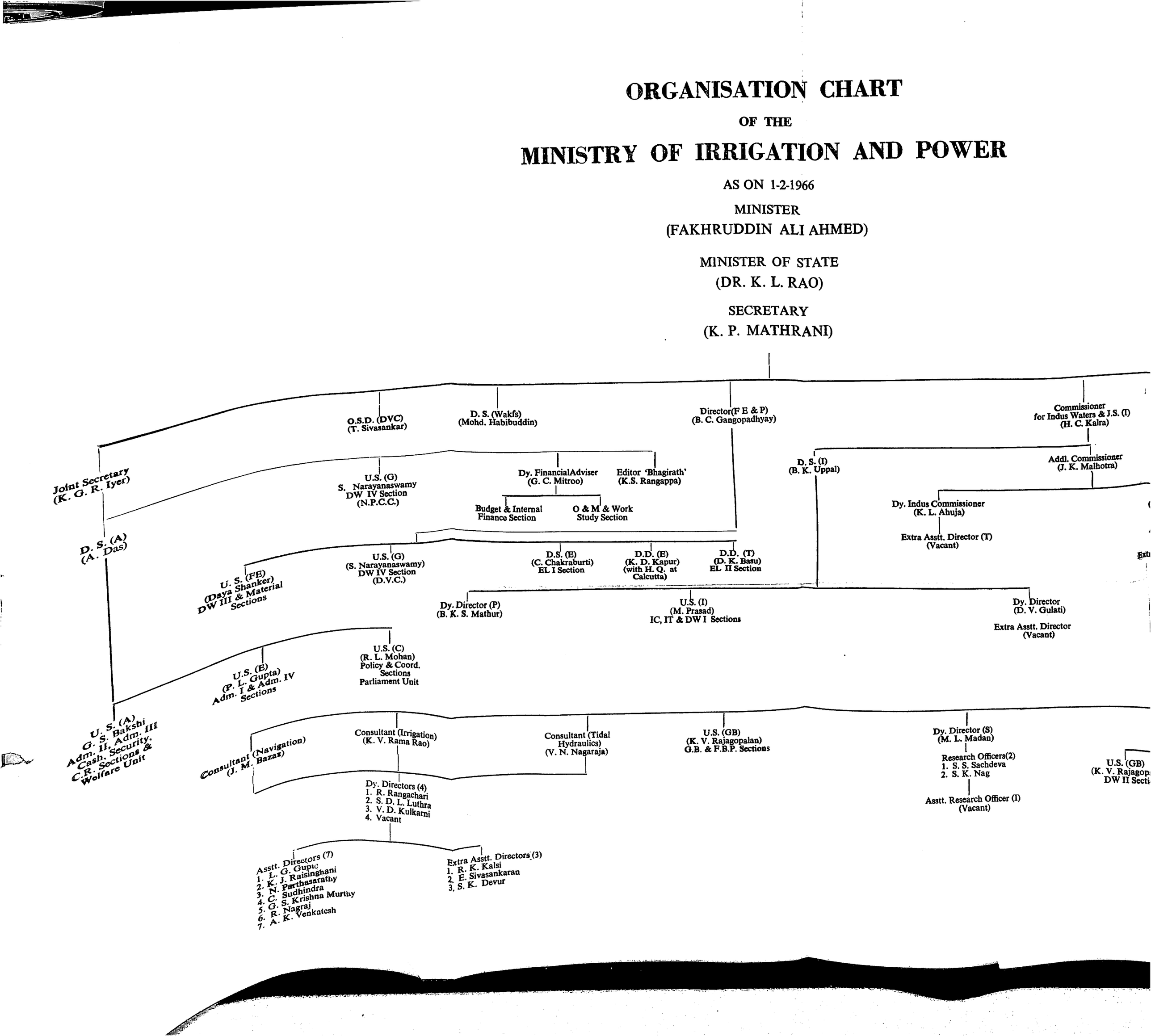

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