Central Electricity Authority

Guidelines for Formulation of Detailed Project Reports for Hydro Electric Schemes, their Acceptance and Examination for Concurrence

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INDEX

Section/ Chapter / Para No.	Contents	Page No.
Index	**Title**	**i - ii**
Section -1	**Requirement for Concurrence of Hydro Electric Schemes**	**1**
1.1	Provisions under the Electricity Act, 2003	1
1.2	Capital expenditure exceeding which Concurrence is required	1
Section -2	**Preparation of Detailed Project Report**	**2 – 40**
2.1	General	2
2.2	Surveys and Investigations	2 – 3
2.3	Preparation and approval of Chapters prior to submission of DPR	3
2.4	Preparation of DPR	4
2.5	Structure of Detailed Project Report	4 – 5
Chapter-I	Introduction	6
Chapter-II	Justification of project from power supply angle	6 - 7
Chapter-III	Basin Development	7
Chapter-IV	Inter-state/ Inter-national aspects	7
Chapter-V	Survey & Investigation	7 – 8
Chapter-VI	Hydrology	8
Chapter-VII	Reservoir	8 – 9
Chapter-VIII	Power Potential Studies & Installed Capacity	9
Chapter-IX	Design of Civil Structures	9 – 10
Chapter-X	Electrical and Mechanical Designs	10 – 11
Chapter-XI	Transmission of Power and Communication facilities	12
Chapter-XII	Construction Programme & Plant Planning	12
Chapter-XIII	Project Organization	12 - 13
Chapter-XIV	Infrastructural Facilities	13
Chapter-XV	Environmental & Ecological aspects	13 – 14
Chapter-XVI	Cost estimates	14 – 23
Chapter-XVII	Allocation of cost	23
Chapter-XVIII	Economic Evaluation	23
Chapter-XIX	Future Utilization of Buildings	23
Chapter-XX	Recommendations	24
Chapter-XXI	Clearances/ Inputs	24 – 25
Annex-2(a)	List of relevant Documents/ References	26
Annex-2(b)	Abstract of Cost Estimates	27 – 35
Annex-2(c)	Phasing of Expenditure	36 – 38
Annex-2(d)	Estimated cost of Project & financial package summary	39 – 40
Section -3	**Submission and acceptance of DPR**	**41 – 42**
3.1	For Power Projects	41
3.2	For Multi-purpose Projects	41 – 42
Section -4	**Examination and Concurrence of DPR**	**43 – 47**
4.1	Examination Procedure	43 – 46
4.2	Concurrence to the Scheme	46
4.3	Submission of updated DPR	46
4.4	Information regarding Financial Closure	46
4.5	Time frame for accord of Concurrence	47

Section/ Chapter / Para No.	Title	Page No.
4.6	Validity of Concurrence	47
4.7	Transfer of Concurrence	47
4.8	Subsequent Changes in the Project Parameters	47
4.9	Availability of Guidelines	47
Appendix		
Appendix-1	Review Mechanism for pre-DPR activities	48
Appendix-2	Power Potential Studies and Installed Capacity	49 – 51
Appendix-3(a)	Checklist-1 (To be examined in office Secretary, CEA)	52 – 53
Appendix-3(b)	Checklist-2 (To be examined in HPA/TCD Divisions/GSI)	54
Appendix-4	Modified modalities for transfer of TEC/ Concurrence/ TEA /Appraisal (in case of future J&K Projects) of Hydro Electric Schemes already cleared/ concurred/ appraised by CEA (including Annexure)	55 – 61
Plates		
Plate-1	Typical bar chart showing different activities to be carried out by the project authorities for preparation of Chapters/ DPR and by CEA/ CWC/ MoWR/ GSI/ CSMRS for approval of pre-DPR Chapters.	62 – 63
Plate-2	Typical flow chart showing different activities to be carried out by the project authorities for preparation of Chapters/ DPR and by CEA/ CWC/ MoWR/ GSI/ CSMRS for approval of pre-DPR Chapters.	64
Plate-3	Typical Flow Chart showing different aspects to be appraised by concerned appraising groups of CEA, CWC, GSI, CSMRS, MOWR etc. after submission of DPR.	65

SECTION-1

REQUIREMENT FOR COCURRENCE OF HYDRO ELECTRIC SCHEMES

1.1 Provisions under the Electricity Act, 2003

1.11 As per Section 8 (1) of the Electricity Act, 2003, any generating company intending to set up a hydro generating station shall prepare and submit to the Authority for its concurrence, a scheme estimated to involve a capital expenditure exceeding such sum, as may be fixed by the Central Government, from time to time, by notification.

11.2 As per Section 8(2) of the Electricity Act, 2003, the Authority shall before concurring to any scheme submitted to it, have particular regard to, whether or not in its opinion, -

a) the proposed river-works will prejudice the prospects for the best ultimate development of the river or its tributaries for power generation, consistent with the requirements of drinking water, irrigation, navigation, flood control, or other public purposes, and for this purpose the Authority shall satisfy itself, after consultation with the State Government, the Central Government, or such other agencies as it may deem appropriate, that an adequate study has been made of the optimum location of dams and other river-works.

b) The proposed scheme meets the norms regarding dam design and safety.

1.1.3 As per Section 8 (3), where a multi-purpose scheme for the development of any river in any region is in operation, the State Government and the generating company shall co-ordinate their activities with the activities of the persons responsible for such scheme in so far as they are inter-related.

1.2. Capital Expenditure exceeding which Concurrence is required

1.2.1 In compliance with Section 8(1) of the Electricity Act, 2003, the Central Government vide Notification No. SO 550(E) dated 18.04.2006 modified vide Notification No. SO 490(E) dated 28.01.2014 has fixed the following limits of capital expenditure for various categories of hydroelectric schemes exceeding which the scheme is to be submitted to the Authority for concurrence:

i) Rs. 2500 crores, provided that –

a) the scheme is included in National Electric Plan (NEP) as notified by Central Electricity Authority (CEA) and conforms to the capacity and type

b) the site for setting up the generating station has been allocated through the transparent process of bidding in accordance with the guidelines issued by Central Govt.

ii) Rs. 1000 crores for any other scheme not covered by para (a) and (b) of clause.

SECTION -2

PREPARATION OF DETAILED PROJECT REPORT

2.1 General

The Detailed Project Report (DPRs) of hydro Electric Schemes required to be submitted to the Authority for concurrence in compliance with the requirement of Section 8 of the Electricity Act, 2003 shall be formulated by Generating Company/ Project Developer as per the guidelines laid down by the Authority considering the following :

(a) the Hydro Electric Scheme aims at best ultimate development of the river basin,

(b) the Scheme is designed for optimum benefits and does not adversely affect the operation of the upstream and downstream Hydro Electric Schemes and takes into consideration the impact of the future upstream and downstream developments in the river basin identified at the Central and State levels.

(c) the Hydro Electric Scheme is consistent with water requirement for drinking water, irrigation, navigation, flood control or other public purposes.

(d) the Hydro Electric Scheme takes into account the progressive development of consumptive use of water and new water resources development schemes in the river basin due to which the water availability may undergo change over the period,

(e) the Hydro Electric Scheme meets the requirement of optimum location of dams and other river works.

(f) the Hydro Electric Scheme meets the norms regarding dam design and dam safety.

(g) the Hydro Electric Scheme is either included in National Electricity Plan drawn by the Authority under section 3(4) of the Act or results in generation of power at reasonable tariff.

(h) the relevant chapters/ DPR is prepared after hydrological studies, essential site surveys and investigations are completed.

(i) the Generating Company shall refer to the latest edition of the "Guidelines for preparation of Detailed Project Report of Irrigation & Multipurpose Schemes" published by the Central Water Commission for civil works and shall consult the relevant documents listed in **Annex – 2(a)** wherever applicable .

2.2 Surveys & Investigations :

After signing MOA with State Govt., developer shall carry out topographical survey & geological surface mapping of the project and submit the proposed layout of the project and detailed investigation plans to CEA for appraisal and finalization. In this connection "Guidelines for Investigations and Explorations required at Detailed Project Report (DPR) Stage of Proposed Hydroelectric Project in Himalayan Terrain" may be referred. CEA along with CWC, GSI and CSMRS shall hold 1st consultation meeting with developer to finalize different alternatives of the project layout for which

investigations are to be carried out by the developer along with detailed investigation plans to be carried out in first phase.

After completion of the first phase investigations, developer shall submit the results to CEA. CEA along with CWC, GSI and CSMRS shall hold 2nd consultation meeting with the developer for finalization of project layout and final phase-II investigations to be carried out by the developer.

For taking clearance on a particular aspect, developer shall submit its report/ chapter only after completing all investigations/ studies as suggested by CEA, CWC, GSI and CSMRS.

All efforts will be made by the developer to complete the investigations and studies as suggested by the concerned appraising group of CEA, CWC, GSI and CSMRS in time.

Developer may approach CEA, CWC, GSI & CSMRS and other agencies in case of any difficulty in finalization of any study or report/ chapter.

CEA and concerned appraising groups shall review the pre-DPR activities with the Developer quarterly for their timely completion. The review mechanism is given at **Appendix-1**. Developer shall approach CEA for holding the first consultation meeting with in a month of project allotment.

2.3 Preparation and approval of Chapters prior to submission of DPR

Prior to submission of DPR to the Authority for its Concurrence/ Appraisal, the generating company shall prepare and submit the following chapters to CEA/ concerned appraising groups for their examination/ approval –

	Chapters/ Aspects		Appraising Groups
i).	General Layout	-	HCD Dte., CWC and HE&TD Div., CEA
ii).	Hydrological Aspects	-	Hydrology Dte., CWC
iii).	Power Potential Aspects	-	HPA Div., CEA
iv).	Foundation Engg. and Seismic Aspects	-	FE&SA Dte, CWC
v).	Geological Aspects	-	GSI
vi).	Construction Material & Geotechnical Aspects	-	CSMRS
vii).	Inter-State Aspects	-	ISM Dte., CWC
viii)	International Aspects	-	MOWR
ix).	ROR/ Storage Aspects/ Pondage (as per IWT, if applicable)	-	Standing Technical Committee, HP&I Div., CEA

After above chapters/ aspects are approved by the concerned appraising groups, the project authorities shall include the same in the DPR to be submitted to the Authority for Concurrence/ appraisal.

2.4 Preparation of DPR

This process of preparation of Detailed Project Report shall be completed by the Developer indicatively in a period of 30 months from the date of allotment/ signing of MOU of the project, extendable by 6 months for reasons beyond the controls of Developer.

For further delay on part of Developer, State Government may make a provision for resorting to levy of a financial penalty against the PP and/ or cancellation of project allotment.

The Data collected by Developer for preparation of DPR shall be property of concerned State Government and its copy shall be made available to CEA/ CWC.

Typical bar chart showing different activities to be carried out by the project authorities for preparation of DPR and by CEA/ CWC/ MoWR/ GSI & CSMRS for approval of above chapters is given at **Plate-1**. Typical flow chart showing different activities to be carried out by project authorities before submission of DPR and pre-DPR clearances by CEA, CWC, MoWR, GSI & CSMRS is given at **Plate-2**.

The DPR prepared by the Generating Company shall be structured in the format as described in the succeeding paragraphs.

2.5 Structure of the Detailed Project Report

2.5.1 The structure of DPR/ details to be included in the respective chapters of the DPR is given below. The sections of *"Guidelines for preparation of Detailed Project Report of Irrigation and Multipurpose Projects" issued by CWC* to be referred are indicated in bracket against the respective components of work.

2.5.2 DPR should include the following chapters :

Chapter -I	Introduction
Chapter –II	Justification of project from power supply angle
Chapter -III	Basin Development
Chapter -IV	Inter-State / Inter-National Aspects (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter -V	Surveys & Investigations (Section 3.4) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter -VI	Hydrology (Section 3.5) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –VII	Reservoir (Section 3.7) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –VIII	Power Potential Studies & Installed Capacity (Refer Appendix-1 of these Guidelines) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –IX	Design of Civil Structures (Section 3.6)

Chapter –X	Electrical and Mechanical Designs
Chapter –XI	Transmission of Power and Communication facilities
Chapter –XII	Construction Programme & Plant Planning (Section 3.13)
Chapter –XIII	Project Organisation
Chapter –XIV	Infrastructural Facilities
Chapter –XV	Environmental & Ecological Aspects
Chapter –XVI	Cost Estimates
Chapter –XVII	Allocation of Cost
Chapter –XVIII	Economic Evaluation
Chapter –XIX	Future Utilisation of Buildings (Section 3.20)
Chapter –XX	Recommendations
Chapter –XXI	Clearances / Inputs

Chapter-wise detailed information to be included in the Detailed Project Reports has been described hereunder.

Chapter -I INTRODUCTION

1.1 Type of the project (run of river, storage, pumped storage, multipurpose)

1.2 Location of the project area including longitude and latitude and district(s) and tehsil/ village etc.

1.3 Access by air/rail/road/ferry, sea port & other communication facilities available in area.

1.4 General climatic conditions in the project area.

1.5 General description of topography, physiography and geology of the project area.

1.6 Historical background of the project:

a) Earlier proposal/ PFR proposal, if any
b) Present proposal

1.7 Need for the project, possible options and justification for selected option.

1.8 Alternative studies carried out for various major components of the project and final choice of the project parameters.

1.9 Natural resources of the State/Region.

1.10 Socio-economic aspects including tribal, backward and drought areas.

1.11 Land required for the project construction – forest land, village land and agricultural land, total area of the land being submerged.

1.12 Population affected by the project and occupation of the people affected.

1.13 Environmental aspects.

1.14 Inter State / Inter-national aspects

1.15 Defence angle, if any.

1.16 Cost and benefits of the scheme.

1.17 Construction Programme

Chapter –II JUSTIFICATION OF THE PROJECT FROM POWER SUPPLY ANGLE

2.1 Justification of project from power supply-demand considerations on all India / regional basis

2.2 Details of scheme for wheeling evacuating power

2.3 Resources for power development in the region/state.

(i) Coal resources
(ii) Hydro resources
(iii) Renewable resources

2.4 Available generating capacity in the state/region from different sources

2.5 Peak load and energy requirement in future in all India/region/state up to the likely date of project completion.

2.6 Likely addition to generating capacity in future in the all India/region/state indicating power supply position with & without the project under consideration and improvement in the hydro-thermal mix.

Chapter -III BASIN DEVELOPMENT

3.1 The course of the river

3.2 Power potential of the river basin and stages of development

3.3 Whether trans-basin diversion of waters involved

3.4 Fitment of the scheme in the overall basin development

3.5 Fitment of the scheme in the power potential assessment studies carried out by CEA

3.6 Effect of future upstream/downstream developments on the potential of proposed scheme

3.7 Conversion of Storage Scheme to ROR, if any (As per already approved chapter/ aspect as referred under para 2.3 above)

Chapter -IV INTER-STATE / INTER-NATIONAL ASPECTS
(As per already approved chapter/ aspect as referred under para 2.3 above)

4.1 States/countries traversed by the river

4.2 Distribution of catchment in states/countries and yields from the catchment of state/ countries concerned.

4.3 Effect of the following on the project:

a) Inter-state agreement on sharing of waters, sharing of benefits and costs, acceptance of submergence in the upstream state(s), if any.

b) Inter-state adjudication, if any

c) Inter-State aspects of territory, property etc. coming under submergence, oustees rehabilitation, compensation etc.

d) Any other aspect of the project involving inter-state problems

e) International aspects, if any

f) International Agreement, if any

4.4 Existing riparian use, quantum of water presently utilized, commitments for ongoing projects, plans for future development, balance share of the state/country and proposed utilization by this project. (Discuss relevant items both for upstream and downstream usages)

Chapter -V SURVEY & INVESTIGATION (Section 3.4)

5.1 Topographical surveys of river, reservoir, head works, colony layout, head race tunnel/channel, power house, switchyard, surge shaft, tail race tunnel/channel, adits, penstock etc. considering different water levels

5.2 Archaeological surveys in the reservoir area.

5.3 Mineral surveys in the catchment areas.

5.4 Right of way surveys for the reservoirs. These shall cover survey for right of approach roads, which may be claimed by owners to various structures above FRL.

5.5 Communication surveys

5.6 Geology & geo-technical features (As per already approved chapter/ aspect as referred under para 2.3 above)

5.7 Seismicity (As per already approved chapter/ aspect as referred under para 2.3 above)

5.8 Foundation investigations of different structures/components of the project indicating boreholes details, soil/rock strata etc. (As per already approved chapter/ aspect as referred under para 2.3 above)

5.9 Construction materials investigations (As per already approved chapter/ aspect as referred under para 2.3 above)

5.10 Hydrological and meteorological investigations.

Chapter -VI HYDROLOGY (Section 3.5)

(As per already approved chapter/ aspect as referred under para 2.3 above)

6.1 Hydrological inputs for the project planning

6.2 Effect of project development on hydrologic regime.

6.3 Hydrological studies for water availability, design flood, design flood levels, diversion flood, sedimentation etc.

Chapter –VII RESERVOIR (Section 3.7)

(As per already approved chapter/ aspect as referred under para 2.3 above)

7.1 Catchment area, annual run-off, submergence, suitability of soil/rock, dead storage level

7.2 Sedimentation data and studies

7.3 Fixation of storage and reservoir levels, { maximum water level (MWL), full reservoir level (FRL), minimum draw down level (MDDL) }, flood cushion etc.

7.4 Life of reservoir in years with basis

7.5 Capacities at MWL, FRL, MDDL, Dead Storage level etc. at project planning stage and after 25, 50, 75 and 100 years or more of operation

7.6 Water tightness of the reservoir

7.7 Annual losses (month-wise) (evaporation, seepage etc.)

7.8 Flood absorption on regular/flash flood

7.9 Effect on subsoil water tables in the adjoining areas upstream and downstream of the dam

7.10 Seismic characteristics and effects due to construction of dam

7.11 Reservoir rim stability

7.12 Length of Reservoir and Area of submergence

7.13 Land acquisition

7.14 Recreation facilities

7.15 Pisci-culture

7.16 Other facilities, if any

7.17 Need and recommendations for soil conservation measures in the catchment.

Chapter –VIII POWER POTENTIAL & INSTALLED CAPACITY
(Refer Appendix-1 of these guidelines)

(As per already approved chapter/ aspect as referred under para 2.3 above)

Conventional H.E. Schemes

8.1 Type of power plant i.e. run-of-river (with or without diurnal storage) or storage type (As per already approved chapter/ aspect as referred under para 2.3 above).

8.2 Assessment of power potential (firm power and 90% dependable energy, secondary energy) of the scheme.

8.3 Studies for optimisation of storage, FRL, MDDL, lean period capabilities etc.

8.4 Monthwise, 10 daily availability of power and energy, peaking capabilities etc.

8.5 Optimisation of installed capacity and unit-size studies carried out.

Pumped Storage Schemes.

8.6 Type of scheme – daily or weekly regulated

8.7 Studies carried out for optimisation of storage capacity, FRL, MDDL etc. of upper and lower reservoirs.

8.8 Studies carried out for optimisation of installed capacity and number of units.

8.9 Operating criteria of the project in generating and pumping mode, availability of pumping energy for pumping operations over the years

8.10 Cycle efficiency of the scheme

Chapter –IX DESIGN OF CIVIL STRUCTURES (Section 3.6)

9.1 Structures & layout (As per already approved chapter/ aspect as referred under para 2.3 above)

9.2 General

(i) Head works - site and vicinity

(ii) Reasons for choice of the layout of the project adopted.

(iii) Type of structure – dam (earth / rock-fill / masonry etc.)

(iv) Layout of dam and spillway / barrage / weir / appurtenants / auxiliary works and power house, reasons for choice of site.

9.3 Geology, seismicity and foundations (As per already approved chapter/ aspect as referred under para 2.3 above)

9.4 Alternative studies carried out for selection of site and type of structures / dam / barrage / weir, regulators, water conductor system, power house etc.

9.5 Choice of final layout of all the major components of the project and reasons – with details

9.6 Design flood and sedimentation studies

9.7 Free board

9.8 River diversion arrangements – choice of design flood with hydro-graphs

9.9 Construction materials (As per already approved chapter/ aspect as referred under para 2.3 above)

9.10 Details of Model of studies

9.11 Design of dam / barrage / weir

9.12 Design of intake, desilting arrangement, power channel/tunnel, balancing reservoir / fore-bay, surge shaft, penstocks, power house, tailrace, switchyard

9.13 Details of instrumentation for various structures

The chapter shall include structural and hydraulic design calculations for dam, spillway gates and energy dissipation arrangements, outlets – regulators, river sluices, intake structures, surge shafts, power house etc. Essential structural calculations shall be furnished. For stability analysis, loading diagrams considering various conditions of water level, earthquake and other forces/stresses considered shall be included.

Chapter –X ELECTRICAL AND MECHANICAL DESIGNS

10.1 Turbine / Pump Turbine

(i) Type

(ii) Operating heads & outputs

(iii) Specific speed and synchronous speed

(iv) Setting of turbine/pump turbine

(v) Speed & pressure rises

(vi) Efficiencies

10.2 Generator / Generator Motor

(i) Type of generator/motor

(ii) Outputs, power factor, generation voltage

(iii) Class of insulation

(iv) Type of cooling

(v) Generator inertia

(vi) Starting method (Pumped storage schemes)

(vii) Efficiencies

10.3 Generator – transformer connections

10.4 Main Inlet Valve

10.5 Surge Protection & Neutral Earthing System

10.6 Supervisory Control and Data Acquisition System

10.7 Penstock Valves, if any

10.8 Main Step-up Transformer

10.9 Switchyard Equipment

10.10 Single-line Scheme

10.11 Control & Protection Equipment

10.12 Auxiliary Mechanical Services

(i) EOT Crane for Powerhouse

(ii) EOT Crane for GIS, if any

(iii) EOT Crane for Penstock Valve House, if any

(iv) Electrical lifts and elevators

(v) Workshop equipment

(vi) Test Laboratory

(vii) Telemetry

(viii) Ventilation & air conditioning

(ix) Fire protection

(x) Cooling water

10.13 Auxiliary Electrical services

(i) Unit Auxiliary Transformers

(ii) Station Service Transformers

(iii) A.C. auxiliary services

(iv) D.C. auxiliary service.

(v) Control and Power Cables

(vi) DG Sets

10.14 Transport limitations

(i) Maximum limiting dimensions (L x W x H) of packages for transport

(ii) Maximum limiting weight of the package which can be transported

The design calculations wherever required shall be included.

Chapter –XI TRANSMISSION OF POWER AND COMMINUCATION FACILITIES

11.1 Transmission of power

i) Consent / Agreement signed between the Generating company and the purchaser(s) (State utility or other buyers)

ii) Letter of Consent from the appropriate Transmission utility to provide evacuation system

iii) Details of the existing and proposed transmission system

iv) Target date of completion of the proposed system

v) Letter of Comfort from the Transmission Company to enter into a back to back agreement with the promoter covering risk in case of default/ delay in commissioning by either of the parties.

11.2 Telecommunication aspects

Chapter –XII - CONSTRUCTION PROGRAMME & PLANT PLANNING (Section 3.13)

12.1 PERT chart giving details of activity-wise construction programme for each of the major components of the civil, electrical and mechanical equipment

12.2 Bar charts showing the construction programme quantity-wise, item-wise and year-wise target of construction

12.3 Key materials planning

12.4 Executing agencies for major works – departmental/contractor

12.5 Various alternatives for construction programme and proper justification of adopted programme

12.6 Plant/equipment planning

12.7 Programme for construction of tunnel / channel shall include :

(i) Excavation of tunnel/channel – cycle time to be given

(ii) Lining of tunnel

(a) Overt
(b) Invert

Chapter –XIII PROJECT ORGANISATION

13.1 Proposed set up for the project

13.1.1 Proposed organization for construction period, Number of staff and expenditure (year-wise)

(i) For civil works

(ii) For electrical and mechanical works

(iii) Administrative & financial set up

(iv) Others

13.1.2 Proposed organization for Pre-construction period

13.1.3 Consultants

Chapter –XIV INFRASTRUCTURAL FACILITIES

14.1 Access roads

(i) Roads to the project

(ii) Roads in the project area

14.2 Rail head

14.3 Port facilities, (as applicable)

14.4 Construction power requirement

14.5 Power supply facilities

14.6 Telecommunication facilities required during construction and after completion of the project

14.7 Project colonies / buildings

14.8 Workshops

14.9 Drinking water facilities

14.10 Others

Chapter –XV ENVIRONMENTAL & ECOLOGICAL ASPECTS

15.1 Status of Environmental clearance

All Hydro Electric Schemes require environmental clearance from MoEF before being taken up for construction. Various information and environmental action plans to be incorporated in the DPR should be as per the latest "Guidelines for Environmental Impact Assessment of River Valley Projects" issued by MoEF. Environmental clearance related aspects such as status of TOR of MoEF/ site clearance, EIA/EMP studies, public hearing, environmental clearance etc. shall be included in the DPR.

15.1 Status of Forest clearance

In case, construction of hydro-electric project involves diversion of forest land, forest clearance would also be required under Forest (Conservation) Act. The case for forest clearance should be submitted to MoEF through State Forest Authorities as per Forest (Conservation) Rules and Guidelines issued by MoEF in this regard from time to time. Details of forest land involved and status of its clearance shall be included in the DPR.

15.3 Cost of proposed remedial & mitigative measures

The cost of the proposed remedial and mitigative measures, if any, to protect the environment must be included in the cost estimates of the project. Mitigative measures may include:

- Rehabilitation measures
- Compensatory afforestation
- Disaster management plan
- Restoration of land in construction areas by filling, grading etc. to prevent further erosion
- Control of aquatic weeds in submerged areas to provide improved habitat for aquatic life
- Measures to salvage/rehabilitation of any rare or endangered species of flora and fauna found in the affected areas
- Enforcement of anti poaching laws
- Measures to prevent forest fires, over grazing of areas etc
- Establishment of fuel depots etc
- Public health measures
- Catchment Area Treatment
- Environmental and ecological studies
- Details about Net Present Value of forest land

15.4 Information regarding wildlife sanctuary likely to be affected and status of clearance of project from National Board of Wild Life

Chapter –XVI COST ESTIMATES

16.1 The Civil Cost Estimates of the project shall be prepared as per "Guidelines for preparation of estimates for the river valley projects" issued by CWC and Indian Standard IS: 4877 "Guide for Preparation of Estimate for River Valley Projects".

Wherever any specific stipulation is made in these guidelines (IS: 4877), these shall take precedence over what is stipulated in CWC guidelines .

16.2 The estimates of Hydro Electric Scheme shall be divided under the heads as indicated at **Annex-2(b)**.

16.2 (a) The estimates of Civil Works of Hydro Electric Scheme shall be divided under the following heads as indicated at **Annex-Civil**.

1. Direct Cost

I. Works

A - Preliminary

B - Land

C - Works

J - Power Plant Civil Works

K - Buildings

M - Plantation

O - Miscellaneous

P – Maintenance during construction

Q - Special T&P

R - Communications

S - Power Plant and Electro- Mechanical system

X - Environment and ecology

Y - Losses on stock

Total I-Works

II. Establishment

III. Tools and Plants

IV. Suspense

V. Receipt and Recoveries

Total (A) - Direct Cost

2. Indirect Cost

i. Capitalisation of Abatement of Land Revenue

ii. Audit and Account Charges

Total (B) - Indirect Cost

Total Cost (A+B)

16.2(b) Cost of Electro-Mechanical Works (Details as per Annex-S)

16.2(c) Cost of Miscellaneous Works (Details as per Annex-Misc)

Cost towards miscellaneous items like, security, helicopter service, setting up of ITI, etc. if required, may also be included in the total estimated cost of the project.

16.3 Preparation of Estimates

16.3.1 The capital cost of a project includes all cost associated with surveys and investigations, design, construction and maintenance during construction period of the project.

16.3.2 For preparation of cost estimates of civil works, the unit costs of labour, materials and equipment necessary to perform the work designated in the various pay-items for the proposed construction shall be determined. Current unit cost shall be used in all estimates and price level of the project estimate shall be mentioned.

16.3.3 The analysis of rates for various items shall be worked out taking into consideration the cost of materials, carriage-handling-storing, labour and share of machines involved in executing various items of the work and overhead charges.

16.3.4 The quantitative assessment of material requirement shall be adopted from authentic books/publications or through independent calculations based on the data available at site or other projects. The unit cost of various materials may be taken as those prevalent in the State/ region. The appropriate cost for freight, unloading, cartage, storage, inspection and testing should also be included.

16.3.5 The wages of workers are periodically revised by the State under the statutory labour laws. Daily wage rates, therefore, shall be taken as those prevalent in the State at the time of formulation of the project.

16.3.6 For working out the use rates of machinery, the norms for life, depreciation, repair provision etc. shall be adopted as recommended by the latest CWC Guide Book on use rate, hire charges and transfer value of equipment and spare parts. Price of various equipment should be taken on the basis of recent quotations/ price list of such equipment. All taxes and freight charges should be taken into consideration while arriving at the cost of equipment at site.

16.3.7 Provision for contingencies and work-charged establishment is generally considered up to 3% and 2% respectively of the works' cost and provided in the detailed works estimates prepared on the heads of items rates and quantities of works to be executed. These percentage provisions should not be considered on lump-sum items.

16.3.8 Mention shall also be made regarding communication facilities available, terrain through which the roads are passing (hilly, plain etc.), type of road (Black top, water bound macadam, murum, kacha etc.).

16.4 Preparation of detailed Estimates of Cost (I -Works)

16.4.1 A- Preliminary

The provision under this head covers the works relating to various investigations, Surveys, Model tests, ecological studies etc. This should be based on the actual cost likely to be incurred and should not exceed 2% of the total cost of I-Works.

16.4.2 B-Land

The provisions under this head covers Acquisition of land, rehabilitation & resettlement including compensation for property, Interest charges, Solatium charges, demarcation & measurement charges etc. The provision should be made as per actual.

16.4.3 C- Works

The provisions under this head is intended to cover the costs of the Head works viz. Dam, spillway, energy dissipation works, desilting arrangement, outlets (irrigation, power, water supply and scour sluices), pick up weir, barrage, head regulators, etc.

16.4.4 J- Power plant civil works

Important items to be considered under this head are listed below :

(a) Intake structures

i) Excavation
ii) Foundation treatment
iii) Cement concrete for foundation, piers and abutments
iv) Masonry/concrete for guide walls of approach channel
v) Concrete for trash racks including raking arrangement
vi) Gates with auxiliary equipment
vii) Reinforcement steel
viii) Instrumentation etc.

(b) Head Race / Tail Race Tunnels (including cut and cover section)

i) Excavation
- Open cut
- Tunnel including temporary supports

ii) Rock bolts
iii) Permanent support, ventilation
iv) Drainage
v) Cement concrete for lining
vi) Steel lining
vii) Drilling and grouting
viii) Gates and ancillaries, where required
ix) Reinforcement steel
x) Instrumentation

(c) Head Race channel and Tail race channel

i) Excavation
ii) Embankment
iii) Lining with cement concrete in bed and sides with drainage pipes and valves
iv) Pucca works
- Cross Drainage(s)
- Escape(s)
- Bridge(s)
- Meter flume
- Balancing tank

v) Instrumentation

(d) Surge shaft

i) Excavation
ii) Cement concrete lining
iii) Drilling and grouting
iv) Miscellaneous items such as masonry, guiniting, steel lining, ladder, bolts etc.
v) Reinforcement steel
vi) Instrumentation

(e) Penstock

i) Excavation
ii) Cement concrete for
- Bed
- Anchor blocks
- Intermediate supports

iii) Steel pipes for
- Stiffner
- Reducers
- Bends
- Wye pieces
- Penstock valves

iv) Instrumentation

(f) Power House

i) Excavation
ii) Concrete for foundation, sub-structure, super structure and supports for turbines and generators
iii) Masonry/concrete for super-structure and other necessary items for building work
iv) Scroll casing / Generator barrel
v) Draft tube
vi) Bulkhead gates, crane and hoisting equipment
vii) Power-house crane
viii) Miscellaneous items such as anchor bolts, grouting etc.
ix) Instrumentation

16.4.5 K – Buildings

The provisions under this head covers the Residential / Non-residential buildings, Office buildings, Testing laboratories, Workshops, Other Service Buildings, Community Centre etc. The provision shall be made as per the actual requirement.

16.4.6 M – Plantation

The provisions under this head covers the plantation programme including Gardens etc. required for beautification as considered necessary downstream of Dam and appurtenances around Power House and other important structure.

The provision should be made on lump sum basis keeping in view the experience of other projects.

16.4.7 O – Miscellaneous

a). The provisions under this head covers the capital cost & maintenance of Water supply, Sewage disposal and drainage works, Recreation, Medical, Fire fighting equipments, Inspection vehicles, School bus, Pay van, Visit of dignitaries, Welfare works etc.

The provision, however, should not exceed the following -.

i) @3% of the cost of I-Works upto Rs.1000 crores limited to Rs. 20 crores

ii) @ 2% of the cost of I-Works upto Rs.2000 crores limited to Rs. 30 crores

iii) @1.5% of the cost of I-Works greater than Rs.2000 crores limited to Rs. 40 crores)

b). Cost of construction power/ electrification & its maintenance shall be examined and provided separately based on the estimates submitted by the project developer.

16.4.8 P - Maintenance during Construction

The provisions under this head covers the cost of maintenance of all works during the construction period. The provision should be 1% of the total cost under the heads of C-Works, J-Power House Civil Works and K-Buildings.

16.4.9 Q – Special T&P

The provisions under this head covers the Drilling & Grouting equipments, Transport, Compaction, Electrical equipments, Construction Plant & Earth Moving equipments and other Miscellaneous equipments. Since the projects are presently being executed through limited contracts package and is the responsibility of the contractor to arrange for such equipment. A token provision of Rs. 1-2 crores under this head may be adequate to provide for essential equipment not coverd under contract package.

16.4.10 R - Communication

The provisions under this head covers the construction of main approach roads, quarry roads, temporary or permanent river crossing, Railways, Bridges, connecting roads, water ways and airstrip/helipad.

The major items on this account shall be supported by sub estimates. The provisions shall be made in consultation with the concerned authorities.

16.4.11 S - Power Plant and Electro – Mechanical System

The provisions under this head cover the Electro-mechanical equipment for the power plant~~,~~ and associated substation under the sub-heads indicated in **Annex-S** "Abstract of Cost Estimates of Electro-Mechanical Equipments".

The provision should be realistic and be based on the current orders and latest market rates. The price levels stating month/year for which the rates are applicable should be indicated.

The cost may be indicated in foreign currency(ies) (fc) applicable for the imported equipment and in Indian rupees (INR) for indigenous Equipment . The total cost may be given as sum of Foreign Component (equivalent in INR) and Domestic Component (INR)

The central sales tax, transportation & insurance, erection & commissioning, contingencies, establishment, T&P and Audit & Account charges may be taken as per 'Abstract of cost estimates'. However, care may be taken that overheads like establishment, contingencies, Audit & Accounts, etc. may not be repeated in cost of civil works.

The rate of central sales tax, custom duty, freight & insurance and service tax may be taken as per prevailing rates at the time of submission of DPR/ Documents.

In case of mega hydro electric projects, benefits if available as per the policy may be considered.

16.4.12 X- Environment and Ecology

This sub-head generally covers the provisions for items like, compensatory afforestation, catchment area treatment, establishment of fuel depot, salvage / rehabilitation of any rare or endangered spicies of flora and fauna, control of aquatic weeds, public health measures to control water or soil borne diseases, Restoration of land, seismological measures etc. The provisions shall be as per actual requirement.

16.4.13 Y- Losses on stock

The provision under this sub-head is generally made at 0.25% of the total cost of C-Works, J-Power Plant Civil Works and K-Buildings only.

16.5 Establishment

Establishment cost during construction of Hydro Electric Projects shall be as per norms given below depending on concentration/ scatteredness of works, length of gestation period and other factors :

16.5.1 Definitions of Concentrated Works/ Scattered Works and Gestation Period :

- Concentrated Works –

  Dam/ Barrage and Power House located at different places involving HRT/ tunnels not more than 5 km in length or total approach road length not more than 10 km.

- Scattered Works –

  Dam/ Barrage and Power House located at different places involving HRT/ tunnels more than 5 km in length or total approach road length more than 10 km.

- Gestation Period (given in Concurrence Letter)

  - Projects involving construction period up to 6 years.

  - Projects involving construction period more than 6 years.

16.5.2 Norms for establishment cost for different slabs of cost of works of projects having **concentrated works and gestation period not more than 6 years** :

i). Civil Works :

Cost of Civil Works (I-B)	**Norms for Establishment cost of civil works**
Up to Rs. 750 Crores	8%
> Rs. 750 Crores up to Rs. 1500 Crores	Rs. 60.00 Crores plus 4.00% of cost exceeding Rs. 750 Crores
> Rs. 1500 Crores up to Rs. 3000	Rs. 90.00 Crores plus 3.00% of cost

Crores	exceeding Rs. 1500 Crores
> Rs. 3000 Crores up to Rs. 6000 Crores	Rs. 135.00 Crores plus 2.00% of cost exceeding Rs. 3000 Crores
> Rs. 6000 Crores	Rs. 195.00 Crores plus 1.00% of cost exceeding Rs. 6000 Crores

These norms would be termed as Basic Establishment Cost for Civil Works (BEC-C) for reference.

ii). E&M Works (¾ of norms of Civil Works) :

Cost of E&M Works (Equipment cost with taxes & duties plus transport, handling & insurance and erection & commissioning)	**Norms for Establishment cost of E&M Works**
Up to Rs. 750 Crores	6%
> Rs. 750 Crores up to Rs. 1500 Crores	Rs. 45.00 Crores plus 3.00% of cost exceeding Rs. 750 Crores
> Rs. 1500 Crores up to Rs. 3000 Crores	Rs. 67.50 Crores plus 2.25% of cost exceeding Rs. 1500 Crores
> Rs. 3000 Crores up to Rs. 6000 Crores	Rs. 101.25 Crores plus 1.50% of cost exceeding Rs. 3000 Crores
> Rs. 6000 Crores	Rs. 146.25 Crores plus 0.75% of cost exceeding Rs. 6000 Crores

These norms would be termed as Basic Establishment Cost for E&M Works (BEC-E) for reference.

16.5.3 Norms for additional provisions of establishment cost in projects having **Scattered Works and/or Gestation Period more than 6 years** :

i). Civil Works :

- Scattered Works : Additional 1% of BEC-C per km for HRT/ tunnels length more than 5 km or total approach road length more than 10 km.
- Gestation Period more than 6 years : Additional 10% of BEC-C per year for the period more than 6 years.

ii). E&M Works :

- Gestation Period more than 6 years : Additional 7.5% of BEC-E per year for the period more than 6 years.

16.5.4 A condition shall be included in the Concurrence letter stating that the Establishment Cost included in the project cost is meant for construction of the project after project is taken up for construction and expenditure incurred on Establishment during pre-construction period has not been considered which shall be applicable on actual basis at Revised Cost Estimates/ Completion Cost stage in case non-starting of construction was due to the reasons beyond the controls of the Developer. Zero date for construction shall be same as given in CEA Concurrence letter/ CCEA/ Govt. approval.

16.5.5 The charges for in-house Design and Engg. services shall be limited to 25% of Basic Establishment Cost (Civil and E&M).

Foreign consultancy shall be limited by in-house D&E ceiling and covered under sub-head "A-Preliminary" in addition to other provisions.

16.5.6 Establishment charges shall be supported by organization chart of manpower proposed to be deployed for the project execution/ implementation and any increase shall be justified at the time of RCE.

16.5.7 The likely increase in Establishment cost during the period of construction on account of revision of pay scale, increase in DA, increment, etc. shall be allowed at the time of RCE/ completion cost stage as per actual.

16.5.8 In case of EPC/ Turnkey mode of execution of project, the actual cost depending on the scope of EPC shall be shifted to works and balance shall be taken for Developers own Establishment. Since the decision regarding type of contract & scope of EPC is not known at the DPR stage, the same shall be adjusted as per actual at RCE stage/ completion cost stage.

16.6 Tools & Plants

The provisions under this head covers survey instruments, camp equipments, office equipments and other small tools. A token provision of Rs. 1-2 crores under this head may be adequate.

16.7 Suspense

The net provision under this minor head will be "NIL" as all the outstanding suspense accounts are expected to be cleared by adjustment to appropriate heads on completion of the project.

16.8 Receipts & recoveries on capital account

This head is meant to account for estimated recoveries by way of resale or transfer of temporary buildings and special T&P. Miscellaneous receipts like rent charges of buildings, electricity charges etc. should also be accounted for under this head.

The recoveries on account of temporary buildings may generally be taken at 15% of the cost unless a higher recovery is anticipated due to some special reason such as tubular construction, vicinity to city/village/town industrial undertaking etc. Such special reasons should be indicated in the report. The recoveries on account of special T&P should be indicated as explained in the sub-head Q-Special T&P. Credit on account of resale of electrical installations, water supply fittings etc., after execution of the project, if anticipated, should also be shown under the head.

16.9 Indirect charges

16.9.1 The complete estimate for a project besides including all anticipated direct charges should further include the indirect charges, i.e. the amount required to cover the capitalisation of abatement of land revenue on the area occupied by the works and allowance for the cost of Audit & Accounts and Establishment.

16.9.2 The provision for Audit and Account charges may be made.:

@ 0.5% of I-Work cost upto Rs. 1000 crores

@ 0.25% of I-Work more than Rs. 1000 crores subject to minimum of Rs. 5 crores.

16.9.3 Charges for capitalisation of abatement of cost of land revenue are generally calculated at either 5% of the culturable land cost or 20 times of the annual revenue lost

Chapter –XVII ALLOCATION OF COST

The details in respect of allocation of cost for each component of the Multipurpose Project shall be based on the cost cleared by Technical Advisory Committee of MOWR. The details in this regard may be clearly spelt out under this Chapter.

In case of projects involving flood moderation, it may clearly be indicated whether the cost of flood moderation as cleared by CWC shall be borne by the concerned beneficiary State/ MOWR.

Chapter –XVIII ECONOMIC EVALUATION

18.1 Phasing of expenditure half yearly as per **Annex-2(c).**

18.2 Interest during construction (IDC)

18.3 Cost of generation at power house bus bars (with IDC)

18.4 Sale rate of energy (with IDC) (with and without free power to home State)

18.5 Levelised tariff (with and without free power to home State)

18.6 Comparison of cost of generation with alternate source of generation in the State/Region

18.7 Project estimated cost and financial package summary shall be submitted as per **Annex-2(d).**

Calculations Shall be carried out as per the tariff order of the Appropriate Regulatory Commission.

Chapter –XIX FUTURE UTILISATION OF BUILDINGS (Section 3.20)

19.1 Details of buildings to be constructed to meet peak requirements of the project

19.2 Departmental requirement of buildings after completion of the project

19.3 Requirement of the buildings by other agencies

19.4 Utilisation of surplus buildings

Chapter –XX RECOMMENDATIONS

20.1 Economic justification of the project

20.2 Socio-economic and other benefits

Chapter –XXI CLEARANCES / INPUTS

21.1 Authenticated Copies of the following Documents/Certificates/Clearances are required to be submitted to CEA for concurrence.

- Letter from the Registrar of Companies indicating that the company has been registered as a Generating Company under Indian Companies Act, 1956
- Article of Association indicating that generation is one of the objectives of the Company
- Letter from Competent Government authorizing the company to establish, own and operate generating power plant. The letter must contain the following
  - Location of Project-State, District, Taluka, Tehsil, Village, longitude and latitude.
  - Capacity of the power plant
- Land availability certificate from State Revenue Authorities
- Water availability certificate from State Irrigation Department/ concerned agency
- Clearance of Ministry of Water Resources/ Central Water Commission as the case may be. In case of inter-state/country aspects, necessary clearance from concerned authority
- Status of Environmental and Forest clearance from Ministry of Environment & Forests, Government of India
- Defence clearance (if applicable)
- Consent / Agreement signed between the Generating company and the purchaser(s) (State utility or other buyers). In case of CPSU project, the willingness for absorption of power by the beneficiary States/ UTs
- Recommendation of the State Govt. on the project cost in case of private projects.
- Any other Statutory clearance from Ministries / Departments / Organisations for the specific aspects of the project, wherever required in the proposed project
- Letter of Comfort from the Transmission Company to provide evacuation system, details of the proposed system and completion schedule.
- Letter of Comfort from the Transmission Company to enter into a back to back agreement with the promoter covering risk in case of default/ delay in commissioning by either of the parties.

- Following clearances from different appraising groups in CEA/ CWC/ GSI/ CSMRS :

i).	General Layout	-	HCD Dte., CWC and HE&TD Div., CEA
ii).	Hydrological Aspects	-	Hydrology Dte., CWC
iii).	Power Potential Aspects	-	HPA Div., CEA
iv).	Foundation Engg. and Seismic Aspects	-	FE&SA Dte, CWC
v).	Geological Aspects	-	GSI
vi).	Construction Material Aspects	-	CSMRS
vii).	Inter-State Aspects	-	ISM Dte., CWC
viii)	International Aspects	-	MOWR
ix).	ROR/ Storage Aspects/ Pondage (as per IWT, if applicable)	-	Standing Technical Committee HP&I Div., CEA

21.2 The DPR shall contain checklists in the beginning of the DPR as given at **Appendix-2(a)** and **Appendix-2(b)**.

Annex –2(a)

List of relevant Documents/ References

1. The Electricity Act, 2003
2. Indian Companies Act, 1956
3. Forest Conservation Act, 1980 and Notifications/Resolutions by MOE&F
4. "Guidelines for preparation of DPRs of Irrigation and Multipurpose Projects" issued by CWC.
5. "Guidelines for preparation of project estimates for major irrigation and multipurpose project" issued by CWC.
6. National Electricity Plan notified by CEA
7. Indian Electricity Sector – Widening Scope for Private Participation-Issued by Ministry of Power.
8. Policy on Hydro Power Development issued by Ministry of Power
9. Guidelines for "Investigation of major irrigation and hydro-electric projects" issued by CWC.
10. Guidelines for Investigations and Explorations required at Detailed Project Report stage of Proposed Hydroelectric Project in Himalayan Terrain.
11. CBIP – Technical Report No.19 "Life of Reservoir (1977)"

12.	IS 5497	:	Guide for topographical surveys for river valley projects
13.	IS 4890	:	Method for measurement of suspended sediment in open rivers
14.	IS 13216	:	Code of practice for geological explorations for reservoir sites.
15.	IS 4186	:	Guide for preparation of project report for river valley projects.
16.	IS 4877	:	Guide for preparation of Estimate for River Valley Projects.
17.	IS 5477 (Part 1-4)	:	Methods for fixing the capacities of reservoirs.
18.	IS 7323	:	Method for determining evaporation from reservoirs.
19.	IS 7323	:	Guidelines for operation of reservoirs.
20.	IS 13028	:	Guidelines for overall planning of river basin.
21.	IS 7560	:	Guidelines for allocation of cost among different purposes of river valley projects.
22.	IS 4247	:	Code of practice for structural design of surface hydel power stations.
23.	IS 12837	:	Guidelines for selection of hydraulic turbines for medium and large hydro-electric power houses.
24.	IS 12800	:	Guidelines for selection of turbines preliminary dimensioning & layout of surface hydro electric power houses.

Note: The above listed documents are available either free or as priced documents from the concerned Govt. Department / Agencies/ Govt. publishers. Latest versions of the above references may be referred.

Annex-2(b)

Abstract of Cost Estimates

Name of Project :

Present Price level : _____
Zero Date : _____
Construction Period : _____
FE Rate : _____

i). Cost estimates at Present Price Level :

Item	Indian Component	Foreign Component		Total
	(Rs Lakhs)	fc	(Eqvt. in Rs Lakhs)	
1. Cost of Civil Works (As per Annex-Civil)				
2. Cost of Electro-Mechanical Works (As per Annex-S)				
3. Cost of Miscellaneous Works (As per Annex-Misc)				
Total Cost of Works (Hard Cost) (1+2+3)				
IDC & FC				
Total Project Cost including IDC & FC				

fc : Foreign Currency

ii). Cost estimates at Completion Level :

Item	Indian Component	Foreign Component		Total
	(Rs Lakhs)	fc	(Eqvt. in Rs Lakhs)	
1. Cost of Civil Works (As per Annex-Civil)				
2. Cost of Electro-Mechanical Works (As per Annex-S)				
3. Cost of Miscellaneous Works (As per Annex-Misc)				
Total Cost of Works (Hard Cost) (1+2+3)				
IDC & FC				
Total Project Cost including IDC & FC				

fc : Foreign Currency

Annual Escalation Factor during pre-construction and construction period:

1. **Civil Works : -------- %**
2. **E&M Works : -------- %**
3. **Misc Works : -------- %**

Annex-Civil

Abstract of Cost Estimates of Civil Works

Name of Project :

Present Price level : _____

Item	Amount (Rs Lakhs)
i). Direct Cost	
I- Works	
A- Preliminary	
B- Land	
C-Civil Works	
J- Power Plant Civil Works	
K-Building	
M-Plantation	
O-Miscellaneous	
P-Maintenance during Construction	
Q-Special T & P	
R-Communication	
X-Environment & Ecology	
Y-Losses on stock	
Total (I- Works)	
II. Establishment	
III. Tools And Plants	
IV. Suspense	
V. Receipt And Recoveries	
Total (Direct Cost)	
ii). Indirect Cost	
a). Capitalisation of Abatement of Land Revenue	
b). Audit and Account Charges	
Total (Indirect Cost)	
Total Cost Civil Works)	

Note :

1. **Head-wise cost of civil works to be furnished in annex forms as per "Guidelines for preparation for project estimates for River Valley Projects" issued by CWC.**
2. **The details of civil works under sub-heads shall be given in Annex and numbered in similar way of main head. For example, Annex giving details of works under sub-heads of main head "C-Works" shall be numbered as Annex-C(1), Annex-C(2), etc.**

Annex-S

_____ H.E. Project (_____ MW)
(Abstract of Cost Estimates of Electro Mechanical Works)

Price level: _____
FE Rate : _____

Sl. No.	Item Particulars	Cost of Equipments, Services, Overheads and Taxes & Duties			
		Indian Component (Rs. Lakhs)	Foreign Component (fc)	Foreign Component (Eqvt. in Rs. Lakhs)	Total (Rs. Lakhs)
1.	**Preliminary – Annex – S(1)**				
2.	**Generating Plant and Auxiliaries** a) Generating Units and Associated Accessories – **Annex –S(2)** b) Auxiliary electrical equipment for power station – **Annex –S(3)** c) Auxiliary mechanical equipment and services for power station- **Annex–S(4)** d) Excise/ Custom Duty (as applicable) on 2 (a), (b) & (c) e) Central Sales Tax (as applicable) on 2(a), (b) & (c) f) Transportation, handling and Insurance charges @ 6% of 2 (a), (b), (c) & (d) g) Erection and commissioning charges @ 8% of 2(a), (b), (c) & (d) excluding spares				
	Sub-Total (Generating Plant and Equipment)				
3	**Switchyard and Pothead Yard Equipment & Services** a) Substation equipment, auxiliary equipment and service of switchyard **- Annex –S(5)** b) Excise/ Custom Duty (as applicable) on 3 (a) c) Central Sales Tax (as applicable) on 3 (a) & (b) d) Transportation, handling and insurance charges @ 6% of 3 (a) & (b) e) Erection and commissioning charges @ 8% of 3 (a) & (b) excluding spares.				
	Sub-Total (Substation Equipment, Auxiliary Equipment and Service of Switchyard)				
4	Contingencies @ 1% on items 2 & 3				
5	Tools and Plants @0.5% of item 2, & 3				
6	**Sub-Total (Item 1 to 6)**				
7	Establishment (As per para 16.5 of Chapter XVI)				
8	**Sub-Total (Item 7 & 8)**				
9	Audit & Account Charges (As per para 16.9.2 of Chapter XVI)				
10	Service Tax (as applicable) on 1, 2(f), 2(g), 3(d) & 3(e)				
	GRAND TOTAL				

fc : Foreign Currency

Annex – S(1)

_____ H.E. Project (_____ MW)
Cost Estimates of Electro Mechanical Works
(Preliminary Works)

Price level: _____
FE Rate : _____

Sl. No.	Item Particulars	Quantity	Rate (Rs./ fc)	Services Cost				Service Tax		Total
				Indian Component (Rs. Lakhs)	Foreign Component (fc)	Foreign Component (Eqvt. in Rs. Lakhs)	Total (Rs. Lakhs)	Rate (%)	Amount (Rs. Lakhs)	(Rs. Lakhs)
1	2	3	4	5	6	7	8=5+7	9	10	11=8+10
1	Design & Consultancy Charges									
2	Model Testing for Turbine									
	Total									

fc : Foreign Currency

Annex – S(2)

_____ H.E. Project (_____ MW)
Cost Estimates of Electro Mechanical Works
(Generating Units and Associated Accessories)

Price level: _____
FE Rate : _____

Sl. No.	Item Particulars	Quantity	Rate (Rs./ fc)	Equipments Cost				Excise/ Custom Duty		Total (Rs Lakhs)
				Indian Component (Rs. Lakhs)	Foreign Component (fc)	Foreign Component (Eqvt. in Rs. Lakhs)	Total (Rs. Lakhs)	Rate (%)	Amount (Rs. Lakhs)	
1	2	3	4	5	6	7	8=5+7	9	10=8x9	11=8+10
1	a) Turbine-Generator units ____ MW, ____ RPM, ____ m head, 0.9 p.f, .___ kV complete with allied equipment such as MIV, Governor, AVR, excitation system etc. b) Unit Control Boards c) Cooling water system comprising pump sets, valves, piping, etc. d) Drainage and Dewatering systems e) HP & LP Compressed Air System including pipes and valves f) Spares @ 5% on item 1(a) to 1(e) (including one spare runner)									
2	___ kV, ___ A Isolated Phase Bus Duct/ Segregated Phase Bus Duct for Generator-Transformer Connection including LAVT, NGT & ICT, Surge Protection & Neutral Earthing system									
3	Supervisory Control and Data Acquisition System (SCADA)									
4	Unit Control & Protection Panels									
5	___ kV, ___- A, Generator Circuit Breaker (if provided)									
6	Lubricating oil & Governor oil for first filling									
7	Pressure Shaft Valve (___ m dia)									
8	Spares @ 3 % on items 2 to 7									
	TOTAL									

fc : Foreign Currency

Annex – S(3)

_____ H.E. Project (_____ MW)
Cost Estimates of Electro Mechanical Works
(Auxiliary Electrical Equipment for power station)

Price level: _____

FE Rate : _____

Sl. No.	Item Particulars	Quantity	Rate (Rs./ fc)	Equipments Cost				Excise/ Custom Duty		Total (Rs Lakhs)
				Indian Component (Rs. Lakhs)	Foreign Component (fc)	Foreign Component (Eqvt. in Rs. Lakhs)	Total (Rs. Lakhs)	Rate (%)	Amount (Rs. Lakhs)	
1	2	3	4	5	6	7	8=5+7	9	10=8x9	11=8+10
1.	Step up Transformer (Rating __kV, __MVA, ___ Phase, _____Type)									
2.	Unit Auxiliary Transformer (Rating __kV, __MVA, _____Type)									
3.	Station Service Transformer (Rating __kV, __MVA, _____Type)									
4.	HT/LT AC Switchgear for power supply to PH complex, Pothead yard, BFV and Dam site									
5.	DC Batteries, Battery charging equipment, D.C. Distribution Board with D.C. switchgear (Rating __V, ___AH & __V & ___AH)									
6.	Diesel generating set (Rating ___ kV, ____kVA) (In addition to construction power)									
7.	Control & Power cables									
8.	Cable Racks, Trays, Supporting Structure and Accessories									
9	CCTV, Surveillance System & Telecommunication Equipments									
10.	Ground Mat & Earthing for Dam, PH complex and Pothead yard									
11.	Illumination of PH complex, BFV house chamber, Pothead yard and Dam site									
12	Electrical Workshop									
13.	Electrical Test Lab & Testing Equipments									
14	**Sub-Total (items 1 to 9)**									
15.	Spares @ 3% on items 14									
	TOTAL									

fc : Foreign Currency

Annex – S(4)

_____ H.E. Project (_____ MW)
Cost Estimates of Electro Mechanical Works
(Auxiliary Mechanical Equipment and Services for power station)

Price level: _____

FE Rate : _____

Sl. No.	Item Particulars	Quantity	Rate (Rs./ fc)	Equipments Cost				Excise/ Custom Duty		Total (Rs Lakhs)
				Indian Component (Rs. Lakhs)	Foreign Component (fc)	Foreign Component (Eqvt. in Rs. Lakhs)	Total (Rs. Lakhs)	Rate (%)	Amount (Rs. Lakhs)	
1	2	3	4	5	6	7	8=5+7	9	10=8x9	11=8+10
1.	Electrical Overhead Traveling crane for PH (Capacity____ T)									
2.	Electrical Overhead Traveling crane for GIS (Capacity____ T)									
3	Electrical Overhead Traveling crane for BFV House (Capacity____ T)									
4.	Electric lifts and elevators									
5.	Fire fighting equipment with storage tanks, pipes, pumps, valves etc.									
6.	Heating, Ventilation and Air conditioning									
7.	Potable Water Supply for PH complex and Pothead yard									
8.	Oil handling equipment with pipes, valves, tanks, purifiers									
9.	Workshop machines and equipment									
10	**Sub-Total (Item 1 to 8)**									
11	Spares @ 3% for item No.10									
	TOTAL									

fc : Foreign Currency

Annex – S(5)

_____ H.E. Project (_____ MW)
Cost Estimates of Electro Mechanical Works
(Switchyard and Pothead Yard Equipment & Services)

Price level: _____

FE Rate : _____

Sl. No.	Item Particulars	Quantity	Rate (Rs./ fc)	Equipments Cost				Excise/ Custom Duty		Total
				Indian Component (Rs. Lakhs)	Foreign Component (fc)	Foreign Component (Eqvt. in Rs. Lakhs)	Total (Rs. Lakhs)	Rate (%)	Amount (Rs. Lakhs)	(Rs Lakhs)
1	2	3	4	5	6	7	8=5+7	9	10=8x9	11=8+10
1.	__ kV Pothead yard/ Switchyard equipment including coupling capacitors, wave traps, LAs etc.									
(a)	___ kV, ___ A, Circuit breaker									
(b)	Isolator/Pantograph with/without earthing blade (Rating __kV)									
(c)	Current transformers (Rating __KV)									
(d)	Potential transformers /CVT (Rating __kV)									
(e)	Lightning arrestors (Rating ___kV)									
(f)	Post Insulator & VT									
(g)	Wave traps (Rating ___kV)									
2	___ kV GIS Bays									
3	___ kV XLPE Cable/ GIB (Gas Insulated Bus Duct)									
4	___ Phase, ___, MVAR, ___ kV, _____ Type Shunt Reactor									
5	Bus conductors, hardware and isolators									
6	Protection Panel for Bus, Line and Reactor									
7	D.C. battery, charger and associated equipment									
8	Fire protection System									
9	PLCC Equipment									
10	Gantry, Foundation for structures & miscellaneous civil works for other equipment, like Shield wire, Insulators, Lightning Masts									
11	Fencing and security									
12	**Sub-Total (1 to 7)**									
13	Spares @ 3% for items 12									
	Total									

fc : Foreign Currency

Annex – Misc

_____ H.E. Project (_____ MW)
Cost Estimates of Miscellaneous Works

Price level: _____
FE Rate : _____

Sl. No.	Item Particulars	Quantity	Rate	Services Cost				Service Tax		Total
			(Rs./ fc)	Indian Component (Rs. Lakhs)	Foreign Component (fc)	Foreign Component (Eqvt. in Rs. Lakhs)	Total (Rs. Lakhs)	Rate (%)	Amount (Rs. Lakhs)	(Rs. Lakhs)
1	2	3	4	5	6	7	8=5+7	9	10	11=8+10
1	**Security Services**									
2	**Helicopter Services, if required**									
3	**Setting up of Industrial Training Institute, if required ***									
	Total (Miscellaneous Works)									

fc : Foreign Currency

* : As per CEA recommendation dated 8.10.2009

Annex –2(c)

PRESENT DAY AND COMPLETED COST
(Phasing of Expenditure of Hard Cost)

Name of the Project :

Capacity : _____ MW
Present Price level : _____
Zero Date : _____
Construction Period : _____
FE Rate : _____

1. Civil Works :

Annual Escalation Factor : _____%

(Rs. Lakhs)

Sl. No.	Item	Present day Cost	6-Monthly phasing					
			6	12	18	24	30	……
	Escalation Factor							
	i) DIRECT COST							
	I- WORKS							
	A- Preliminary							
	B- Land							
	C-Civil Works							
	J- Power Plant Civil							
	K-Building							
	M-Plantation							
	O-Miscellaneous							
	P-Maintenance							
	Q-Special T & P							
	R-Communication							
	X-Environment & Ecology							
	Y-Losses on stock							
	TOTAL (I- WORKS)							
	II- Establishment							
	III- Tools and Plants							
	IV- Suspense							
	V- Receipt and recoveries							
	TOTAL (DIRECT COST)							
	ii) INDIRECT COST a) Capitalised value of abatement of land revenue							
	b) Audit and Account charges							
	TOTAL (INDIRECT COST)							
	TOTAL (CIVIL COST)							

2. E&M Works :

Annual Escalation Factor (IC) : _____%
Annual Escalation Factor (FC) : _____%

(Rs. Lakhs)

Sl. No.	Item	Present day Cost	6-Monthly phasing					
			6	12	18	24	30	……
	Escalation Factor(IC)							
	Escalation Factor(FC)							
	I. E&M EQUIPMENT							
	i). EOT Crane							
	ii). T.G. Sets							
	iii). Bus Duct							
	iv). Penstock Valves							
	v). Power Transformer							
	vi). Protection and Relay Panels							
	vii). AC Supply System							
	viii). Switchyard							
	ix). GIS							
	x). Power and Control Cables							
	xi). SCADA							
	xii). Electrical Auxiliaries							
	xiii). Mechanical Auxiliaries							
	xiv). Initial Spares (IC)							
	xv). Initial Spares (FC)							
	TOTAL (E&M EQUIPMENT)							
	II. SERVICES							
	i). Preliminary Works							
	ii). Freight & Insurance							
	iii). Erection & Commissioning							
	Total (Services)							
	III. TAXES & DUTIES							
	i). Custom Duty							
	ii). Excise Duty							
	iii). Central Sales Tax							
	iv). Service Tax							
	TOTAL (TAX & DUTIES)							
	IV. OVERHEADS							
	i). Establishment							
	ii). Contingencies							
	iii). Tools & Plants							
	iv). Audit & Account							
	TOTAL (OVERHEADS)							
	TOTAL (E & M COST)							

3. Miscellaneous Works :

Annual Escalation Factor : _____%

(Rs. Lakhs)

Sl. No.	Item	Present day Cost	6-Monthly phasing					
			6	12	18	24	30	……
	Escalation Factor							
	i). Security							
	ii). Helicopter Service, if required							
	iii). Setting up of Industrial Training Institute, if required							
	Total (Misc Cost)							
	Grand Total (Civil, E&M and Misc. Cost)							

Note: Present day cost of each item/ group of items (Annex-2c) will be phased on half yearly basis and escalated at a rate based on prevailing indices to arrive at completed (Escalated) cost and indicated as per the following format.

Sl. No.	Item	Present day Cost	6-Monthly phasing					
			6	12	18	24	30	……
	Name of item (% phasing)							
1	***(Present day phased cost)***							
	(Escalated phased cost)							
2	***:***							
	:							
	:							
	:							
	:							
	:							

Annex-2(d)

ESTIMATED COST OF PROJECT & FINANCIAL PACKAGE SUMMARY

A. ESTIMATED COST OF PROJECT

1	Name of Project							
2.	Capacity (MW)							
3	Name of Promoter							
4	Location							
5	State							
Sl. No.	Item	Currency	Foreign Currency Component			Indian Component (Rs. Crores)	Total Cost (Rs. Crores)	% of total cost
			Amount	Exchange Rate @	Equivalent in Indian Rs. Crores			
(1)	(2)	(3)	(4)	(5)	(6)=(4)x(5)	(7)	(8)=(6)+(7)	(9)
1	**Hard Cost** (excluding IDC & Financing Charges)	(i)…						
		(ii)…..						
		(iii)….						
		(iv)…						
						Sub-Total (1) =		
2	**IDC (@@)**							
	(i) Debt Package-I							
	(ii) Debt Package-II							
	(iii) Debt Package-III							
						Sub-Total (2) =		
3	**Financing Charges**							
	(i) Debt Package-I	(i)…						
	(ii) Debt Package-II	(ii)						
	(iii) Debt Package-III	(iii)….						
	(iv) Others (if any)	(iv)…						
						Sub-Total (3) =		
						GRAND TOTAL (1+2+3)		

NOTES:

(i) @ - Exchange Rate prevailing at the time of price level of the cost.

(ii) @@ - Detailed calculation for interest during construction (IDC) shall be attached separately for each Debt Package (in respective currencies) clearly indicating Drawl of funds, phasing of expenditure & Gestation Period etc.

(iii) If the currencies or Debt Packages are more, the additional Columns / Rows may be suitably inserted.

B. FINANCIAL PACKAGE SUMMARY

B1. DEBT FINANCING

Sl.No.	Source/ Name of Agency	Currency	Foreign Currency Component			Interest rate % (Fixed) Floating	Repayment period (Years)	Moratorium period (if any) (Years)
			Amount	Exchange rate @	Equivalent in Indian Rs. Cr			
(1)	(2)	(3)	(4)	(5)	(6)=(4)x(5)	(7)	(8)	(9)
(a)	**Foreign Debt**							
1	Source I							
2	Source II							
			Sub-Total (a) =					
(b)	**Domestic Debt**							
1	Source I							
2	Source II							
			Sub-Total (b) =					
		TOTAL DEBT (a) + (b) =						

B2 EQUITY FINANCING

Sl.No.	Source/ Name of Equity Partners	Currency	Foreign Currency Component			Remarks
			Amount	Exchange rate @	Equivalent in Indian Rs. Cr	
(1)	(2)	(3)	(4)	(5)	(6)=(4)x(5)	(7)
(a)	**Foreign Equity**					
1	Promoters					
2	Others					
			Sub-Total (a) =			
(b)	**Domestic Equity**	Rs.	…..			
1	Promoters	Rs.	…….			
2	Others	Rs	…….			
3	Public Issue (If any)					
			Sub-Total (b) =			
		TOTAL EQUITY (a) + (b) =				
	DEBT + EQUITY (B1 + B2) =			**DEBT : EQUITY RATIO =**		

FINANCING CHARGES #

Sl.No.	Item	Upfront charges (Rs. Cr.)	Commitment charges (Rs. Cr.)	Guarantee Fees (Rs. Cr.) @	Others (if any) (Rs. Cr.)	Total Financing Charges (Rs. Cr)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(3)+(4)+(5)+(6)	(8)
	DEBT						
1	Source I						
2	Source II						
3	Source III						
	EQUITY						
1	Public Issue Charges						
					Total		

- Financing Charges as applicable for the Project may be indicated.
@ - Exchange Rate prevailing at the time of submission of DPR/Documents.

SECTION-3

SUBMISSION AND ACCEPTANCE OF DPR

3.1 For Power Projects

3.1.1 The Generating Company / Project Developer intending to set up a hydro generating station shall submit the DPR to the Authority for its concurrence as required under Section 8 of the Electricity Act, 2003.

3.1.2 Submission of DPR

Generating Company / Project Developer shall submit 25 copies of DPR including chapters approved by respective appraising groups as described under para 2.3 along with six soft copies on compact disks to Secretary, CEA for its examination. CEA/CWC/GSI/CSMRS shall check whether all the information, data, certificates essentially required for appraisal of DPR and clearance of Chapters/ aspects mentioned above in para 3.1.3 have been included as per the Checklists (Checklist-1 and Checklist-2 appended with these guidelines) with in 3 weeks time.

3.1.3 Acceptance of DPR

In case of DPRs submitted for the first time, the Generating Company / Project Developer shall give a detailed presentation on all aspects of DPR after 3 weeks of submission of DPR. After the deliberations in the presentation meeting, decision would be taken as to whether the details furnished in the DPR are adequate for further examination of DPR or DPR is to be returned for carrying out further studies/ furnishing details which may take long time. In case it is found that the DPR does not contain essential inputs or is found to be incomplete in certain respects, the same shall be returned to the Generating Company / Project Developer for resubmission after incorporating the requisite details. If prima facie, the DPR is found to be in order, it shall be taken up for detailed examination.

In case of DPRs earlier received in CEA and returned due to lack of essential inputs or completeness in certain respects and resubmitted now, the DPR shall be examined in CEA/CWC/GSI/CSMRS within a period of 3 weeks of submission of DPR whether the developer has complied with the observations / reasons due to which the DPR was earlier returned and the details furnished in the DPR are adequate. If the observations / reasons are complied with and duly incorporated in the DPR and the details furnished in the DPR are adequate, CEA/CWC/GSI/CSMRS shall take up the DPR for further examination. If the observations / reasons are not complied with or the details in the DPR are not adequate, the DPR shall be returned for compliance of observations / reasons or carrying out further studies / investigations.

3.2 For Multi-Purpose Projects

3.2.1 DPRs of multipurpose projects involving drinking water, irrigation, power, flood control, navigation etc shall be submitted to CWC for clearance of Technical Advisory Committee (TAC) of Ministry of Water resources (MOWR). In case DPRs of these schemes are submitted to the Authority, the Authority shall not accept the same and redirect these to CWC/ MOWR for examination/appraisal.

The views of the Authority on power portion of the scheme viz. power planning and cost estimates shall be submitted to CWC for accord of clearance by Technical Advisory Committee of MOWR. Detailed examination of Hydro Electric Scheme shall be undertaken by the Authority after DPR of the power portion is submitted to it for accord of concurrence under Section 8 of the Electricity Act, 2003.

3.2.2 DPRs of power projects, involving flood moderation aspects only in addition to power generation shall be accepted in CEA and referred to CWC for examination of the flood moderation aspects. Detailed examination of such schemes could be continued by CEA (as per procedure mentioned above in Para 3.1) along with appraisal of scheme by CWC/ MOWR for flood moderation aspects. However, the date of acceptance of such scheme in CEA for appraisal would be reckoned from the date of clearance of flood moderation aspects by CWC/ MOWR.

SECTION-4

EXAMINATION AND CONCURRENCE OF DPR

4.1 Examination Procedure

4.1.1 To discharge its obligation under Section 8 of the Electricity Act, 2003, the Authority may take the assistance of Central Water Commission, Ministry of Water Resources, Geological Survey of India (GSI) etc. The Authority may also consult the State Government or Central Government or such other Government agencies as it may deem appropriate.

4.1.2 The comments / queries raised by the Authority shall be promptly replied by the Generating Company / Project Developer preferably within a period of 7 working days and not more than 15 working days, failing which the DPR shall stand returned to the generating company.

4.1.3 Appraisal of DPR

The Authority acts as a single agency in so far as concurrence of the Hydro Electric Schemes is concerned. However, as per the demarcation of responsibility in Govt. of India, the following aspects related to Hydro Electric Schemes are assigned to MOWR:

- Hydraulic Structures for hydropower
- Water Management
- Flood Control
- Dam Safety
- Regulation and development of inter-state rivers and river basins
- Water laws legislation
- International water laws
- The matter regarding rivers common to India and neighboring countries: Joint River Commission for Bangladesh and India, Indus Water Treaty, Indus Commission etc.

CEA therefore consults CWC/ MOWR on issues related to Inter-State/ International clearance, Hydrology, design of Hydraulic Structures, Dam design & Safety, Construction Material & geotechnical aspects, Construction methodology and Machinery, Cost of civil works, etc.

Typical Flow Chart showing different aspects to be appraised by concerned appraising groups of CEA, CWC, GSI, CSMRS, MOWR etc. after submission of DPR is given at **Plate-3**.

The examination of a Hydro Electric Scheme is an interactive process and involves appraisal of various aspects like Hydrology, Hydro power planning, Design and safety of the dam, Hydel civil design, Electro-mechanical design, Geology, Construction material, Cost, project financing etc.

In order to appraise DPR expeditiously, the following procedure would be followed for furnishing of observations/ comments by appraising groups and compliance by the developers/ generating companies :

i). Appraising groups will send their comments directly to developers/ generating companies with copies to PAC(CEA)/ PAO(CWC) and HPA(CEA) through e-mail followed by post copy through PAC(CEA)/ PAO(CWC).

ii). Developers/ generating companies will send their compliance to the comments directly to Appraising groups with copies to PAC(CEA)/ PAO(CWC) and HPA(CEA) through e-mail followed by post copy through PAC(CEA)/ PAO(CWC).

4.1.4 Aspects to be appraised

i. **Hydrology:** An accurate assessment of the hydrology at the project site is crucial as this plays a vital role in the planning of Hydro Electric Schemes and the design of various hydrological structures. An over estimate of water availability may lead to higher installation and larger investment whereas a lower estimate may result in non-utilization of potential optimally. Appraisal of the project hydrology includes water availability studies, design flood estimation, diversion flood estimation and sedimentation studies for estimating the life of the project.

ii. **Hydro Power Planning: P**ower potential studies carried out for all the hydrological years for which data is available including the installed capacity, number and size of units are examined. General layout of the Scheme whether it fits into the overall basin development plan or not is also examined.

iii. **Dam and Head Works** : Design and safety of the dam and appurtenant works are examined.

iv. **Hydraulic Structures/ Hydel Civil Design:** Techno- economic evaluation of water conductor system and power house comprising of intake, de-silting arrangement, head race tunnel, surge shaft, pressure shaft/ penstock, tailrace tunnel/ channel and the type/ layout and dimensions of the power house is made to ensure that the surveys and investigations carried to finalize the layout & designs are adequate, layout is optimum & is evolved after evaluation of various alternatives; project components are safe, planning & design has been carried out utilizing state of the art technology and relevant standards.

v. **Geology :** Geology of the project components is appraised to ensure that detailed geological mapping & geophysical surveys have been done, drilling/ drifting carried out and structural features viz. thrusts, folds/faults have been studied in detail to delineate problems during construction.

vi. **Electro-Mechanical Design:** Design & layout of turbine-generator sets, main step-up transformer, auxiliary equipment in the power house and switchyard / gas insulated switchgear room etc. are appraised.

vii. **Justification of the Project:** The Authority examines the need/ justification of the project from anticipated power demand (both energy and peak) and reasonability of tariff of energy generation.

viii. **Construction Material and Geotechnical aspects:** Appraisal of the quantity of the local construction material available at project site/ quarries and the properties of rock/ soil for foundation of the structures is carried out.

Ix. **Construction Methodology and Machinery:** Appraisal of the construction methodology and equipment used in the project construction.

x. **Inter-State/ International aspects:** The inter-State/ international aspects are examined in consultation with CWC/ Ministry of Water Resources, which provide necessary suggestions to the Authority.

xi. **Cost Estimates**

a) **Cost Estimates of Civil Works:** After the designs of various works are frozen, the quantities of various components of civil works are checked for correctness. Analysis of rate of main works like excavation, concreting, RCC works, stripping, filling, grouting etc. based on hourly use rates of equipment is done and the estimated cost of civil works proposed in the DPR is finalized.

b) **Cost of Electro-Mechanical Works**: For appraisal of cost estimates of E & M Equipments/ Works, estimated cost is assessed based on cost data of similar equipments/ works in other projects for which concurrence have been accorded recently by CEA or orders have been placed recently or budgetary offers etc.

c) **Cost of Miscellaneous Works**: For appraisal of cost estimates of Miscellaneous Works, like security services, helicopter services, if required, setting up of one ITI, if required, etc., the estimated cost is assessed based on cost data of similar works/ services in other projects for which concurrence have been accorded recently by CEA or orders have been placed recently or budgetary offers etc.

xii. **Evacuation of Power:** Adequacy of power evacuation arrangements proposed in the DPR is examined.

xiii. **Construction Schedule:** Activity-wise, item-wise and year-wise targets/ schedule of construction for each of the major components of works as per detailed PERT Chart are examined.

xiv. **Financial and Commercial Aspects:** Financing and financial analysis of the project including financial package, interest during construction, financial charges and tariff are examined.

xv. **Clearance from Defence Angle:** If a hydro electric scheme involves defence aspects, clearance of the project from Ministry of Defence is required.

xvi. **Clearance from MoEF:** Development of Hydro Electric Schemes may have adverse impact on environment and ecology viz. deforestation, loss of bio-diversity including disappearance of rare species of animals and plants, soil erosion, faster rate of reservoir sedimentation, socio-economic implications, relocation and rehabilitation of people, increased seismic risk, change in aquatic system, climatic change, change in flow regimes downstream of the dam and outbreak of disease etc.

The Environment Impact Assessment and Environment Management Plans are to be prepared by the Generating Company / Project developer and submitted to MoEF. The same are examined by MoEF and cleared if found satisfactory. In case the project involves diversion of forest land, clearance is also required from forest angle from MoEF under the Forest Conservation Act. For the schemes involving wild life sanctuary/ national park, recommendations/ approval of Indian Board of Wild Life is necessary.

Information on rehabilitation and resettlement aspects of the project viz. villages / families / persons affected, details of R&R Plan and its approval by MoEF is also required.

Information on tribal population affected and status of clearance under Forest Rights Act/ from Ministry of Social Justice & Empowerment/ State Government is also necessary, if tribal population is affected.

4.1.5 For hydro electric schemes selected through tariff based competitive bidding, the Authority shall examine the technical viability consistent with the provisions of the Act.

4.2 Concurrence to the Scheme

4.2.1 In case the Hydro Electric Scheme is found technically and economically viable with necessary inputs and clearances having been tied-up, the Authority may accord concurrence for implementation of the Hydro Electric Scheme, under Section 8 (2) of the Electricity Act, 2003.

"Guidelines for accord of concurrence to Hydro Electric Schemes submitted to the Authority under Section 8 of the Electricity Act, 2003" are available on CEA's website (www.cea.nic.in).

4.2.2 The intimation regarding accord of concurrence to hydro electric schemes is conveyed to the Generating Company / Project Developer, Ministry of Power, Planning Commission, other concerned Government Departments, State Govt. and appropriate Regulatory Commission.

4.3 Submission of updated DPR

4.3.1 During the appraisal process, a number of changes are suggested by CEA/CWC/GSI/CSMRS which have an impact on the design and cost of the scheme. The Generating Company / Project Developer is required to update the DPR incorporating all the suggested modifications as agreed by them during the deliberations and submit the same on compact disk along with 6 (six) nos. of hard copies for record of the Authority.

4.3.2 The Generating Company / Project Developer is also required to submit the updated DPR to concerned State Government, the Regulatory Commission and the Transmission Utility under intimation to the Authority.

4.4 Information regarding Financial Closure

After the finance for the project is tied up, the Generating Company / Project Developer shall inform the details of the financial package to the Authority.

4.5 Time Frame for accord of Concurrence

In case the Hydro Electric Scheme is found technically and economically viable with necessary inputs/ clearances having been tied up, the Authority may accord concurrence for implementation of the hydro electric scheme, as far as practicable, within a period of 150 (one hundred fifty) working days (excluding time taken by the Developer for compliance of observations of CEA/ CWC/ GSI/ CSMRS etc.) from the date of submission of 25 sets of DPR complete in all respects/ acceptance of Complete DPR by CEA from Developer.

4.6 Validity of Concurrence

4.6.1 In case the time gap between the concurrence to the scheme by the Authority and the actual start of the work of the project by the generating company is three years or more, a fresh concurrence of the Authority shall be obtained by the Generating Company/ Project Developer before the start of actual work.

Revalidation of Concurrence can also be considered, in case the reasons for not starting of works are beyond the control of generating company. However, proposal for revalidation shall be submitted three months before the expiry of validity of Concurrence, which is three years from the date of issue of Concurrence letter.

The Generating Company may apply for revalidation of the Concurrence giving justification after getting due authorization of the appropriate Government. The Authority will consider the request for extension of the validity based on the merit.

4.6.2 The Authority reserves the right to revoke the concurrence, if the conditions stipulated in the Office Memorandum conveying the Concurrence are not complied with to the satisfaction of the Authority.

4.7 Transfer of Concurrence

Concurrence/ Appraisal (in case of future J&K Projects) to the Hydro Electric Scheme given by the Authority in the name of a generating company can be transferred to another generating company in accordance with the procedure laid down by the Authority (given at **Apendix-3**). The new Generating Company/ Project Developer shall submit the request for such a transfer for the consideration of the Authority.

4.8 Subsequent changes in the Project parameters

In case, there are major changes in the parameters of the project viz. type of development (storage/ ROR), type & height of dam, live storage, design head, installed capacity, number of units, type of turbine, type of power house, transmission voltage etc, from those concurred by the Authority necessitated on account of site conditions, the same need to be brought to the notice of the Authority with appropriate justification for its approval prior to implementation of such changes in the project.

4.9 Availability of Guidelines

Central Electricity Authority's "Guidelines for Formulation of Detailed Project Reports for Hydro Electric Schemes, their Acceptance and Examination for Concurrence" are available on the Authority's website (www.cea.nic.in).

Appendix-1

Review Mechanism for pre-DPR activities by CEA and concerned appraising groups with the Project Proponent

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The review/consultation mechanism shall be as under:-

- After signing MOA with State Govt., the developer shall carry out topographical survey & geological surface mapping of the project and submit the proposed layout of the project and detailed investigation plans to HP&I Division, CEA along with CWC, GSI and CSMRS for appraisal and finalization.

- CEA along with other agencies shall hold meeting with developer to finalize different alternatives of the project layout for which investigations are to be carried out by the developer along with detailed investigation plan to be carried out in first phase. This meeting would be followed up with subsequent quarterly meetings till first phase investigations are completed.

- After completion of the first phase investigations, the developer shall submit the results to HP&I Division, CEA along with CWC, GSI and CSMRS. CEA along with other agencies shall hold a meeting with the developer for finalization of project layout and final phase-II investigations to be carried out by the developer. This meeting would be followed up with subsequent quarterly meetings till the full DPR is actually submitted to CEA for concurrence by the developer.

Miscellaneous:-

- For holding the consultation meeting(s)/ taking clearance on a particular aspect, the developer shall submit its request along with concerned report(s) to the concerned Directorates/Divisions/Organizations under intimation to HP&I Division of CEA.

  All efforts will be made by the developer to complete the investigations and studies as suggested by the concerned agencies like CEA, CWC, GSI, or CSMRS, in time.

- The developer may approach CEA and other agencies in case of any difficulty in finalization of any study or report.

- Developer shall submit hydrological studies after collection of hydrological data at site for at least two years.

Appendix-2

Power Potential Studies and Installed Capacity

After finalization of hydrology, the next step is to determine installed capacity and unit size of the project.

For determination of installed capacity ensure that the-

i) Efficiencies of T-G sets are taken correctly.
ii) Rated head assessments are accurate.
iii) Minimum discharges as per requirement of MoEF during monsoon & non-monsoon seasons and remaining period for aquatic life are taken.
iv) Provision has been made for discharges during monsoon season for silt flushing.
v) Other requirements of water are met.

1 FOR ROR SCHEMES

1.1 Computation of 90% dependable year

i) Obtain 10-daily hydrological inflow series in m^3/sec for all hydrological years, year-wise.

ii) Calculate unrestricted energy generation in MUs.

iii) Arrange unrestricted annual energy generation in descending order.

iv) 0.9(n+1)th year is the 90% dependable year, where n is the number of years for which hydrological inflows data is available.

90% dependable year is a year with probability of energy generation of equal or more than 90%.

1.2 Fixating the installed capacity

i) Calculate firm power available based on average power generation during the lean months flows in a 90% dependable year.

ii) Consider a number of alternatives of installed capacities in suitable steps.

iii) Compute incremental energy generation (Δ KWH) for every incremental MW (Δ MW) and plot result on a graph.

iv) Installed capacity is fixed at a value where the fall in the graph is sharp.

v) B/C ratio and incremental benefit cost ratio ($\Delta B/\Delta C$) is also considered for fixing the installed capacity. An alternative for installed capacities which provides maximum net benefit (B-C) and ensures incremental ($\Delta B/\Delta C$) higher than unity is considered optimum

vi) Other factors like annual load factor, lean period load factor, peaking requirement, potential utilization etc may also be considered.

1.3 Selecting unit-size & Number of Units

i) Number of generating units should be kept minimum because the cost of generating units and related equipment increases with the increase in number of units

ii) Unit-size is decided based on the transport limitations i.e. maximum size (LxWxH) of package of generating units/ transformer which can be transported to site.

iii) Where more than one units are to be installed in a power house, these should be of the same capacity to facilitate inter-changeability of generating units, spares and other equipment in the station.

iv) The unit size should be verified for system stability and loss of generation probability criteria.

v) In case of run-of-river schemes without pondage, numbers of units are decided keeping in view the varying discharge during lean period and turbine operating characteristics.

1.4 Computing Design energy

i) 10-daily unrestricted energy generation after meeting the water requirement for aquatic life as per MoEF stipulation in TOR/ approval in 90% dependable year is restricted to 95% of the installed capacity of the power house. The total of these 10-daily restricted energies for the year gives the annual design energy generation.

2 FOR STORAGE BASED SCHEMES

2.1 A reservoir is created to store the excess water during the high inflow period and release it as and when required.

The storage provided can be for -

1) annual operation i.e. every year the reservoir is depleted to its minimum draw-down level

2) carry over operation i.e. waters from good hydrological year is carried over to the bad hydrological years that may follow.

2.2 Multipurpose reservoirs are planned to serve more than one purpose. In Indian conditions the multi-purpose reservoirs are planned for drinking water, irrigation, hydro electric power, flood control and flood moderation etc. Planning of such a reservoir requires detailed analysis of past run off records and other hydrological data.

2.3 In case of hydro power projects involving flood moderation, in addition to power generation, the reservoirs are planned to have cushion for flood moderation during flood periods.

2.4 Fixing the storage capacity, FRL and MDDL of Reservoir

The capacity of the reservoir shall be fixed based on the guidelines given in IS: 5477 (Part-1, 2, 3 and 4) “Fixing the capacity of Reservoirs”.

Live storage is the volume of water stored in the reservoir between FRL and MDDL. It can be provided to meet peak power requirement. For the project governed by Indus water Treaty (IWT), allowable pondage is computed as per the procedure laid down in IWT. However, topological restrictions may restrict allowable pondage.

After the reservoir capacity is determined, the next step would be to fix the FRL/ MDDL. Area / Elevation Curves of the proposed site are used to determine these levels. While fixing the FRL/ MWL, the factors like upper level of domain of the project allotted by the State Government, submergence in reservoir area, tail water level of upstream development, free flow stretch to be left between two projects as per MoEF stipulations, if any, geological constraints in raising dam height etc. are fully taken in to account.

For determining the MDDL, the considerations like siltation of reservoir during the life of the project, water to be drawn directly from the reservoir for the purpose other than generation, live storage to be provided, safe limit of operating heads of the turbines etc. are considered.

The reservoirs are operated in order to achieve the maximum benefits consistent with their physical characteristics and functions for which they are planned and constructed. For actual operation of reservoir or a system of reservoirs, individual regulation schedules are required to be formulated, after considering all critical factors involved.

Reservoir operation studies are carried out in accordance with IS: 7323 – 1994 “Operation of Reservoirs Guidelines”. Levels computed in the above studies are refined considering the optimum benefits/ cost analysis.

Appendix-3(a)

Checklist – 1 (To be examined in the office of Secretary, CEA)

S. No	ITEM	REMARKS
1.	Name of the project	
2.	Location a) State(s) b) District(s) c) Taluka(s)/Tehsil(s) d) Basin e) River f) Longitude/Latitude g) Survey of India Topographical Map reference No.(s) h) Earthquake Zone number i) Complete address for correspondence along with pin code/ e-mail, FAX, Telephone numbers of Nodal Officer and Alternate Nodal Officer.	
3.	Whether the scheme is included in the National Electricity Plan. If so, whether the capacity and type of the scheme are same as given in the NEP.	* Yes / No
4.	Category of the project a) Power Project b) Power Project having reservoir for flood moderation. c) Multipurpose Project	*
5.	In case of category 4c) above, whether the clearance of Technical Advisory Committee of Ministry of Water Resources is available.	* Yes / No
6.	Mode of formation of the Generating Company in terms of Clause-2(28) of Electricity Act, 2003.	*
7.	Whether the Generating Company is Registered with the Registrar of the Company. Whether Article of Association has Generation as one of the objectives of the Company	* Yes / No
8.	What is the mode of allocation of the scheme whether through i) MOU route upto 100 MW ii) Tariff based bidding iii) MOU route with equity participation of State Govt. If so %age of State Govt. equity iv) Any other mode	*
9.	Whether authorization of the Competent Government in favour of the company to establish, operate and maintain specific Power Station available	* Yes /No
10.	Whether land availability Certificate from State Government available	Yes/No
11.	Whether State Govt. authorised the company to utilize water of that stretch of river.	Yes/No
12.	Whether power/energy benefits have been estimated on the updated hydrological series.	*Yes /No

13.	Whether Cost Estimates enclosed Present Day & Completed Cost - For Generating Companies in Central, State, Private and Joint Sectors and For SEBs & State power Utilities	*Yes/No
14.	Financial Analysis/ How the project is going to be financed.	
15.	Whether arrangement for absorption/ dispatch of power made	Yes/ No
16.	Whether arrangements for wheeling/ evacuation of Power made	Yes/ No
17.	Whether any agreement with the transmission company to provide evacuation system made. If so details of the agreement.	Yes/ No
18.	Whether Consent of STU/ State Govt. for availability of off peak power/energy (for pumped storage scheme) is obtained.	Yes/ No
19.	Whether salient features of the Project filled up in the prescribed format.	Yes/ No
20.	Status of CWC /other affected States clearance from inter-state angle, if applicable	*
21.	Status of Defence clearance, if required	*
22.	Whether the area is likely to have any Environmental and Ecological problems due to the altered surface water pattern If yes, whether preventive measures have been discussed	Yes /No
23.	Status of MoEF Clearance from Environment & Forest angle	
24.	Status of Clearance from Indian Board of Wild-Life	
25.	Status of Clearance under Forest Rights Act from Ministry of Social Justice & Empowerment/ State Government (In case Scheduled Tribe population is affected)	
26.	Whether Rehabilitation and Resettlement Plan from State Revenue Department enclosed.	Yes/No
27	Whether approvals of CEA/ CWC/ GSI/ CSMRS have been obtained and included in the DPR in respect of following aspects -	*
	i). Gen. Layout by HCD Dte., CWC & HE&TD Div., CEA	Yes/No
	ii). Hydrological Aspects by Hydrology Dte., CWC	Yes/No
	iii). Power Potential Aspects by HPA Div. CEA	Yes/No
	iv). Foundation Engg. and Seismic Aspects by FE&SA Dte, CWC	Yes/No
	v). Geological Aspects by GSI	Yes/No
	vi). Construction Material Aspects by CSMRS	Yes/No
	vii). Inter-State Aspects by ISM Dte, CWC	Yes/No
	viii) International Aspects by MOWR	Yes/No
	ix). ROR/ Storage Aspects by Standing Technical Committee/ Pondage (as per IWT, if applicable), HP&I Div., CEA	Yes/No

Note : In case marked 'Yes' in the Check List, attach the supporting document.

* : Must for examination of DPR

Appendix-3(b)

Checklist – 2 (To be examined in HPA /TCD Divisions/ GSI/ CSMRS)

A. Following chapters/documents should be available in the DPR

i) Basin Planning
ii) Power supply position in the State and justification of the scheme from power demand and supply considerations
iii) Project layout map and drawings
iv) Hydrology
v) Power Potential Studies
vi) Geology
vii) Construction Material and Geotechnical aspects
viii) Foundation Engineering and Seismicity aspects
ix). Inter-State/ International aspects
x) Design of civil structures
xi) Design of Electrical & Mechanical equipment
xii) Power evacuation aspect
xiii) Estimated cost along with basis of preparation of cost and documentary support
xiv) Financial analysis
xv) Environment and ecology
xvi) Set of drawings giving general layout of the project, civil components, E&M equipment, Single Line switching scheme etc.

B. Completeness and relevance of material given in the above chapters needs to be checked.

Appendix-4

Government of India
Central Electricity Authority
Sewa Bhavan, R.K.Puram
New Delhi-110066.

No. CEA/103/18/2010-HPA/1452 Dated : 29th December, 2010

OFFICE MEMORANDUM

Subject: Modified modalities for transfer of Techno Economic Clearance (TEC)/ Concurrence/ Techno-Economic Appraisal (TEA)/ Appraisal (in case of future J&K Projects) of Hydro Electric Schemes already cleared/ concurred/ appraised by CEA.

Modalities of simplified transfer of Techno-Economic Clearance of Hydro Electric Schemes already cleared by CEA were issued by CEA vide letter no. 103/18/98/HAD/CEA dated 8-10-99. After enactment of 'The Electricity Act, 2003', these have been modified and the modified procedure is given below which supersedes the earlier one:

I. FOR SCHEMES WITHOUT ANY CHANGE IN SCHEME FEATURES AND COST ESTIMATES

i) In case the new agency furnishes a certificate to the effect that there is no change in the cost estimates and the project features as were cleared/ concurred/ appraised by the Authority originally, the Techno Economic Clearance (TEC)/ Concurrence/ Techno-Economic Appraisal (TEA)/ Appraisal (in case of J&K Projects) will be transferred to it by the approval of Authority in its internal meeting on receipt of the following:

a) A request by the new agency for transfer of Techno Economic Clearance (TEC)/ Concurrence/ Techno-Economic Appraisal (TEA)/ Appraisal (in case of J&K Projects).
b) Approval of the Competent Government(s) for transfer of the scheme to the new agency
c) Implementation Agreement between the new agency and the Competent Government (s).
d) Certificate to the effect that developer would abide by stipulations of Electricity Act, 2003 and Amendments there to.
e) Certificate to the effect that developer would abide by the provisions of Hydro Power Policy 2008 and other policies & guidelines etc. issued by the Govt. of India from time to time.
f) Certificate to the effect that developer would abide by the provisions of "Guidelines for participation of foreign companies in tenders for work packages of Hydroelectric Projects in sensitive areas, 2009" (**Annexure**) and seek prior clearance from Ministry of Home Affairs, if applicable, and not obtained earlier.

ii) The above transfer of Techno Economic Clearance (TEC)/ Concurrence/ Techno-Economic Appraisal (TEA)/ Appraisal (in case of J&K Projects) shall be subject to furnishing the following by the new agency within ONE YEAR of the transfer of Techno Economic Clearance (TEC)/ Concurrence/ Techno-Economic Appraisal (TEA)/ Appraisal (in case of J&K Projects).

a) Valid Environment and Forest clearance in the name of the new agency.

b) Clearance of CWC from inter-State/ Country aspects. Clearance from MOWR, if so warranted.

II. FOR SCHEMES ENVISAGING CHANGES IN SCHEME FEATURES AND / OR COST ESTIMATES

i) In case the new agency envisages changes in the parameters of the project and/or cost estimates with respect to the Techno Economic Clearance (TEC)/ Concurrence/ Techno-Economic Appraisal (TEA)/ Appraisal (in case of J&K Projects) already accorded by the Authority, the "In Principle" transfer of Techno Economic Clearance (TEC)/ Concurrence/ Techno-Economic Appraisal (TEA)/ Appraisal (in case of J&K Projects) in the name of new agency shall be effected, on submission of the documents mentioned at 1(i) (a)/ (b)/ (c)/ (d)/ (e)/ (f). Such transfer shall be valid for a period of TWO YEARS within which, the new agency shall furnish the following in respect of the revised scheme, for consideration of fresh Techno Economic Clearance (TEC)/ Concurrence/ Techno-Economic Appraisal (TEA)/ Appraisal (in case of J&K Projects), by the Authority as per the extant procedure being followed for accord of Concurrence/ Appraisal (in case of J&K Projects) to new schemes:

a) Preparation and submission of DPR as per prevalent guidelines issued by CEA.
b) Updated hydrology, optimization studies, technical parameters, Cost estimates, etc., with supporting design calculations, details, drawings etc.
c) Comparative statement of features as Techno Economic Clearance (TEC)/ Concurrence/ Techno-Economic Appraisal (TEA)/ Appraisal (in case of J&K Projects) and as now proposed with justification for necessitating changes.
d) Clearance of CWC from Inter-State/Country aspects. Clearance from MOWR, if so warranted.
e) Valid Environment and Forest clearance in the name of the new agency.

Authority shall have the right to revoke the transfer of Techno Economic Clearance (TEC)/ Concurrence/ Techno-Economic Appraisal (TEA)/ Appraisal (in case of J&K Projects), if any, of the conditions stipulated in para I & II above are not fulfilled.

Sd/-

(Amarjeet Singh)
Secretary, CEA

Copy to:

1. Minister of Power, Govt. of India, Shram Shakti Bhawan, New Delhi.
2. Secretary (Power), Ministry of Power, Shram Shakti Bhawan, New Delhi.
3. Special Secretary, Ministry of Power, Shram Shakti Bhawan, New Delhi.
4. Additional Secretary, Ministry of Power, Shram Shakti Bhawan, New Delhi.
5. Joint Secretary (Hydro), Ministry of Power, Shram Shakti Bhawan, New Delhi.
6. Chairperson, CEA
7. Chairman, CWC
8. Member (Hydro), CEA
9. All Members of CEA
10. All Members of CWC
11. Chief Secretary, All State Governments – with request for circulation to all developers of HE Projects in the State.
12. Secretary (Power), All State Governments
13. All Chairmen of SEBs
14. All State Vidyut Nigam Ltd.
15. CMDs of NHPC, SJVNL, THDC, NEEPCO, NTPC
16. All Chief Engineers, CEA
17. CERC
18. SERCs.
19. CEA Website.

Annexure

No. 7/1/2002-DO(NHPC) [Vol.II]
Government of India
Ministry of Power

Shram Shakti Bhawan, Rafi Marg
New Delhi, dated-03.09.2009

OFFICE MEMORENDUM

Sub: Guidelines for participation of foreign companies in tenders for work packages of Hydroelectric Projects in sensitive areas.

The Government hereby lays down the following guidelines for participation of foreign companies in tenders for work packages of Hydroelectric Projects in sensitive areas.

1. (a) These guidelines may be called "Guidelines for participation of foreign companies in tenders for work packages of Hydroelectric Projects in sensitive areas, 2009' and shall be applicable from the date of their issue.

2. (a) These guidelines have been framed, on the considerations that:-

   National security will be a critical determinant while making choices in regard to hydro-electric projects in sensitive regions and border areas. Along the border, the concerned area may extend to a width of 50 kms on the Indian side of the international border with neighbouring countries. Every hydro-electric project, within this belt, with foreign participation of any form will need prior security clearance. This would extend to both public and private sector projects.

   Prior clearance would apply in the case of similar hydro-electric projects being set up in certain sensitive locations, even if these are away from the border. Specific guidelines will be drawn up in consultation with the Ministry of Home Affairs to draw up a list of such sensitive locations.

   Security aspects of hydro projects also need to be kept in view elsewhere as well. These would involve ensuring the safety and security of structures such as dams, intakes, tunnels, etc. Security implications shall inevitably form part of any pre-contract discussions and must be addressed prior to the actual commencement of the project or assigning of a project to any party.

3. (a) These guidelines shall be applicable to all Hydro-Electric Projects, being set up in the Central and State Sector and by Independent Power Producers with foreign participation of any form, regardless of the Project size or investment limit, located in the State of Jammu & Kashmir, in the North Eastern States including Sikkim and within an aerial distance of 50 kilometers on the Indian side of the international border with neighboring countries or of the line of control (LOC) with Pakistan, or the Line of Actual Control (LAC) with Tibet Autonomous region (China), or within any notified restricted/Protected areas, or within sensitive locations as identified by Ministry of Home Affairs from time to time.

4. (a) The State Government, before allotting any Hydro-Electric project covered by criteria at 3 above to a foreign company or to a company involving foreign collaboration in any form including Build Own Operate (BOO) or Build Operate Transfer (BOT), shall seek prior clearance from Ministry of Home Affairs.

(b) Similarly, a Developer of any Hydro-Electric Project covered by the criteria at 3 above, before appointing a foreign contractor or sub-contractor, shall seek prior clearance from Ministry of Home Affairs, through the State Government concerned. The details of the foreign companies shall be provided by the Developer.

(c) In case of a bid process for selection of a developer, contractor or sub-contractor such clearance from Ministry of Home Affairs shall be sought at the stage of Request for Qualification (RFQ).

5. (a) The Ministry of Home Affairs shall give its clearance/advise within 6 weeks on the reference from the State Government or from the Developer through the State government, as to whether the foreign developer/ contractor/ sub-contractor needs to be eliminated on the grounds of national security, invoking a clauses to be inserted in all bid documents to the effect that any bid can be rejected without assigning any reason.

(b) The period of 6 weeks shall commence from the date complete details are made available in the reference/questionnaire to the Ministry of Home Affairs.

(c) If the clearance/advice from Ministry of Home Affairs is not received within 6 weeks, the bid process would continue its normal course.

6. Once a foreign developer/ contractor/ sub-contractor has been qualified at the RFQ stage to submit his commercial bid, he should not be eliminated on the ground of national security.

7.(a) The project developer would evaluate and determine the optimum number of foreign employees required to be deployed at the project being awarded or sub-contracted to a foreign company, keeping in view the project's requirements, location and technical necessities. The number of foreign employees would be kept to the minimum and be confined only to technical/supervisory staff.

(b) Foreign employees would ordinarily be expected to confine their stay and movements to the designated place of stay and project site. Any visits outside the project site in any Restricted/Protected areas would only be undertaken after permission from the competent authority is obtained through the company in which they are employed, failing which they will be liable to action as per prevalent rules and orders. It will be the specific responsibility of the developer to ensure that the contract with the foreign company carries a clause that if the personnel of that Company are found indulging in activities prejudicial to India's national security interest, then the project developer may cancel the contract without any liability.

(c) The project developer shall furnish the list of foreigners (consultants, contractors, employees or retainers) proposed to be engaged in the project, with their full particulars (passport details, job profile/expertise, duration/location of stay, etc.) well in advance, which would be vetted before issue of visa.

(d) The Ministry of Power will certify in case of CPSUs, the project completion time and the requirement of the foreign personnel, while in case of all other projects, this will be certified by the concerned State Government.

8. (a) The Ministry of External Affairs in consultation with Ministry of Home Affairs will decide on the kind of Visa to be issued.

(b) While issuing visa/work permits, the Ministry of External Affairs will impose the necessary restrictions on specific individuals or on employees of specific companies that need to be watched, as well as the total number of visas issued at a given point of time in respect of project, so as to ensure compliance of the guidelines. Particular care would also be taken in respect of projects which are already allotted or where contracts and sub-contracts are already allotted, in the interest of national security.

9. If any equipment or electrical gadgets are proposed to be imported for the execution/implementation of the project, the promoters and CPSU's shall provide the equipment details, purpose, import route, etc., to the Department of Power/Energy in the State Government or to the ministry of Power as the case may be.

10. Considering the importance of security and safety aspects of all Hydro-Electric Projects including Hydro-Electric Projects not covered at criterion 3 above, Central Electricity Authority will, in consultation with Ministry of Home Affairs, also address the issue of ensuring safety and security of structures such as dams, intakes, tunnels etc. and, where considered necessary, issue guidelines for the purpose. These guidelines will be taken into account while according concurrence under Section 8 of the Electricity Act, 2003. Observance of such security guidelines by Hydro-Electric Projects that do not require Central Electricity Authority's concurrence under Section 8 of the Electricity Act, 2003, will be ensured by the respective State Government.

11. Prior clearance of security implications should inevitably form part of any pre-contract negotiations and must be addressed prior to the actual commencement of the Project or assigning of a Project to any Party.

12. The Ministry of Power shall ensure implementation of these guidelines by the CPSU's under its administrative control. The primary responsibility of ensuring compliance of these guidelines in respect of other Developers shall be that of the State Governments in consultation with the Ministry of Home Affairs.

Sd/-
(Kamal Bose)
Under Secretary to the Govt, of India
Tel. No. 2332.4357

To

Energy/Power Secretaries of all the State Governments

Copy forwarded to :

1. Foreign Secretary, South Block, New Delhi
2. Secretary (R) R&AW, New Delhi.
3. Home Secretary, North Block, New Delhi
4. Director Intelligence Bureau, New Delhi
5. Secretary, Deptt. of Industrial Policy, Udyog Bhawan, New Delhi.
6. Secretary, Department of Heavy Industry, Udyog Bhawan, New Delhi.
7. Dy. National Security Adviser, Sardar Patel Bhawan, New Delhi.
8. Defence Secretary, South Block, New Delhi
9. Principal Secretary to PM, PMP, South Block New Delhi.
10. Secretary, Department of Economic Affairs, North Block, New Delhi.
11. Cabinet Secretariat (Shri K.L. Sharma Director) Rashtrapati Bhawan, New Delhi.
12. Chairperson CEA, R.K. Puram, New Delhi.

Copy also to in the Ministry of Power :

PS to Minister of Power/PS to Minister of State for Power
PS to secretary (Power)/Sr. PPS to AS(AK)/PPS to AS (GBP)
PS to all Joint secretaries
Economic Adviser
All Directors/Deputy Secretaries

Plate-1

PREPARATION OF DETAILED PROJECT REPORT
(TYPICAL BAR CHART SHOWING DIFFERENT ACTIVITIES TO BE CARRIED OUT BY PROJECT AUTHORITIES FOR PREPARATION OF DPR)

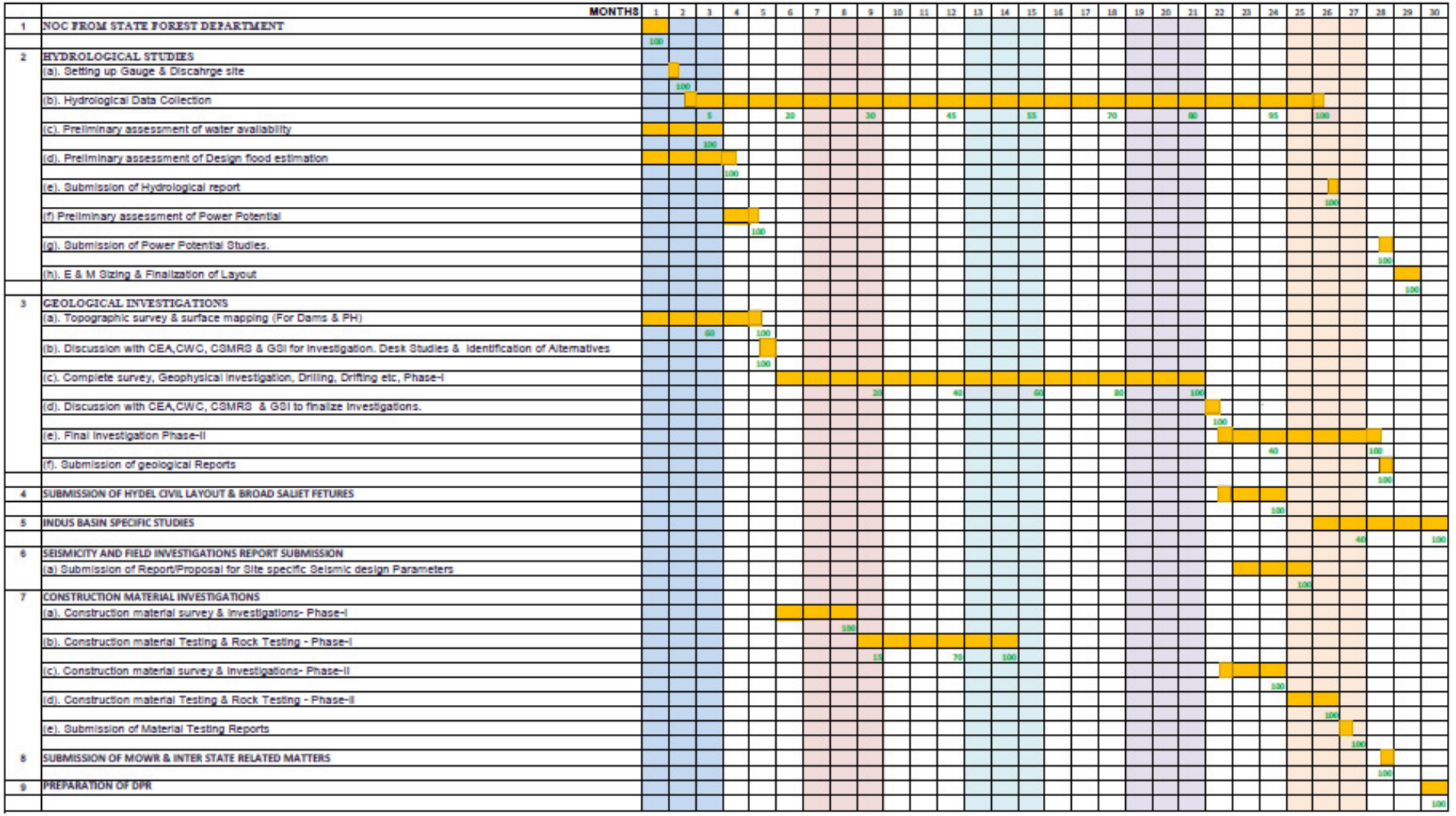
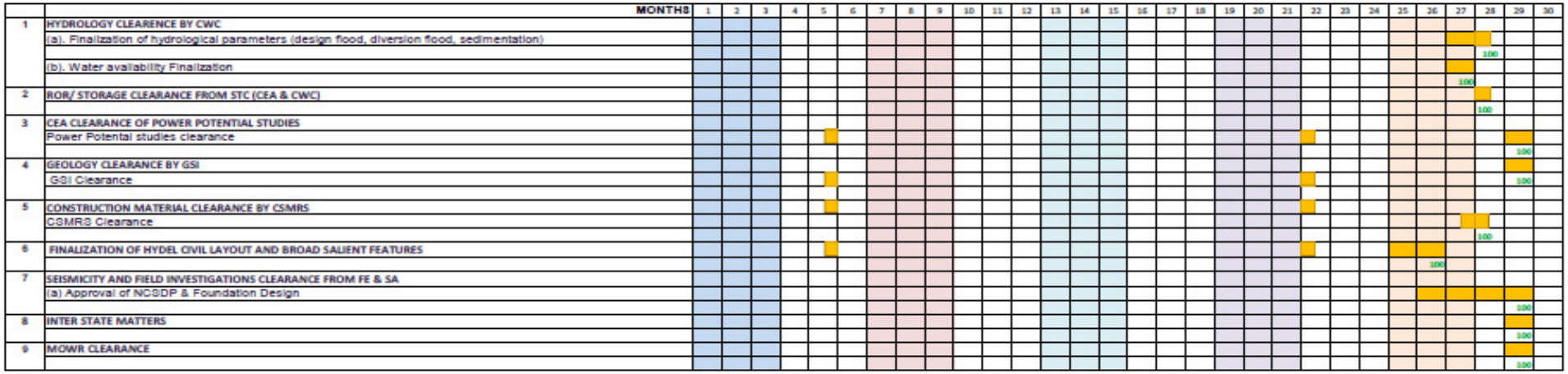


Plate-1 (Contd.)

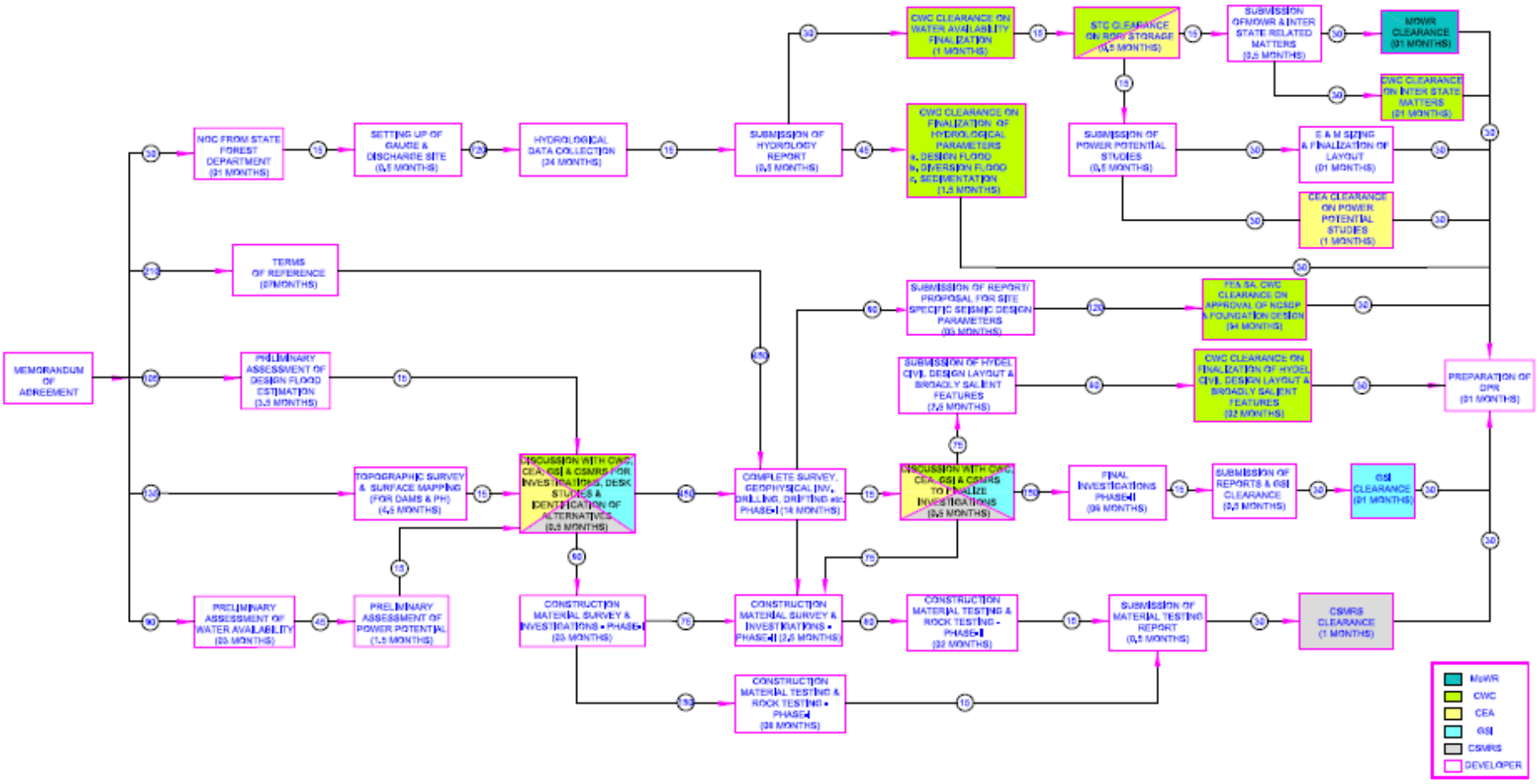
PREPARATION OF DETAILED PROJECT REPORT
(TYPICAL BAR CHART SHOWING DIFFERENT ACTIVITIES TO BE CARRIED OUT BY CWC/ CEA/ MoWR/ GSI & CSMRS)

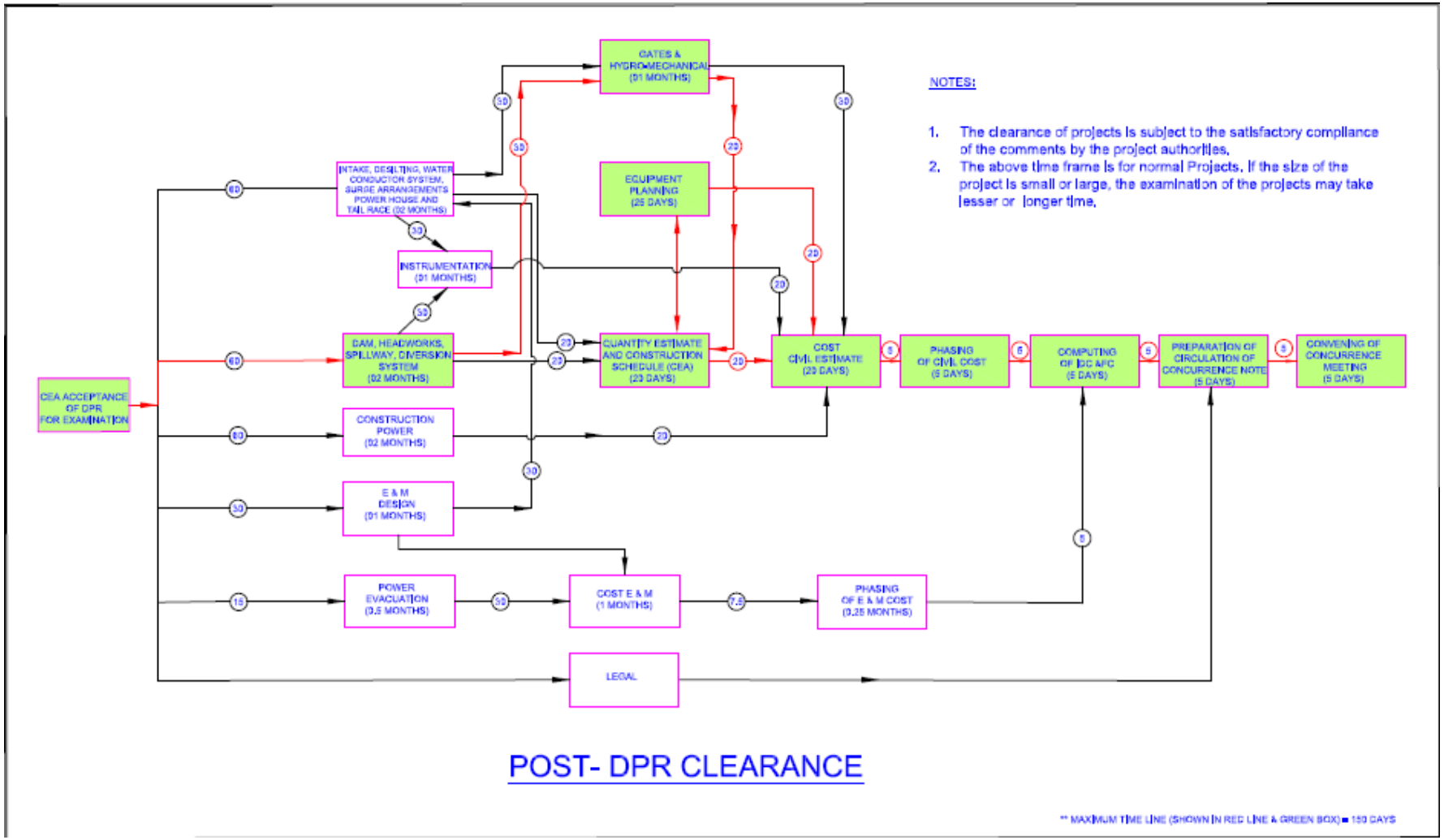


Note : Consultation by project developers with CEA, CWC, GSI and CSMRS in 5th and 22nd months for framing/ finalization of Chapters on pondage (as per IWT if applicable), Power planning aspects, Geological aspects, Construction material aspects and Hydel Civil Layout and broad salient features.

Note 1: Zero date indicates date of MOA with the state government.
Note 2: Digits indicating % age of works to be completed in respected quarter.
Note 3: TOR by MoEF is a pre-requisite for commencement of activity 3 (c)
Note 4: Additional studies required for international negotiations shall be carried out by the developer. (For Indus basin specific projects)

FLOW CHART SHOWING DIFFERT ACTIVITIES TO BE CARRIED OUT BY PROJECT AUTHORITY/ DEVELOPER BEFORE SUBMISSION OF DPR AND PRE-DPR CLEARANCE FROM MOWR/CEA/CWC, GSI & CSMRS




GATES & HYDROMECHANICAL (01 MONTHS)
INTAKE, DESILTING, WATER CONDUCTOR SYSTEM, SURGE ARRANGEMENTS POWER HOUSE AND TAIL RACE (02 MONTHS)
EQUIPMENT PLANNING (25 DAYS)
INSTRUMENTATION (01 MONTHS)
DAM, HEADWORKS, SPILLWAY, DIVERSION SYSTEM (02 MONTHS)
QUANTITY ESTIMATE AND CONSTRUCTION SCHEDULE (CEA) (23 DAYS)
COST CIVIL ESTIMATE (23 DAYS)
PHASING OF CIVIL COST (5 DAYS)
COMPUTING OF IDC AFC (5 DAYS)
PREPARATION OF CIRCULATION OF CONCURRENCE NOTE (5 DAYS)
CONVENING OF CONCURRENCE MEETING (5 DAYS)
CEA ACCEPTANCE OF DPR FOR EXAMINATION
CONSTRUCTION POWER (02 MONTHS)
E & M DESIGN (01 MONTHS)
POWER EVACUATION (3.5 MONTHS)
COST E & M (1 MONTHS)
PHASING OF E & M COST (3.25 MONTHS)
LEGAL
NOTES:
1. The clearance of projects is subject to the satisfactory compliance of the comments by the project authorities.
2. The above time frame is for normal Projects. If the size of the project is small or large, the examination of the projects may take lesser or longer time.
POST- DPR CLEARANCE
** MAXIMUM TIME LINE (SHOWN IN RED LINE & GREEN BOX) = 150 DAYS