S. No.	Item Description	Installation#1	Installation#2	Installation#3
(c)	*Manufactured / *Got Manufactured	*Yes/No	*Yes/No	*Yes/No
(d)	*Erected/*Supervised Erection/**Acted as an Advisor for Erection	*Yes/No	*Yes/No	*Yes/No
(e)	*Commissioned/*Supervised Commissioning/**Acted as an Advisor for Commissioning	*Yes/No	*Yes/No	*Yes/No

** Necessary Documents/ certificates from the client, in support of Note No. 2 for Clause no. 1.0.0 of Item No. 4.0 of BDS are Attached at Annexure..... of this Attachment.

1.02.00 Details of Generator

1.02.01 Generator make and model No.

1.02.02 Rated MVA

1.02.03 Rated Power Factor

1.02.04 MW rating

1.02.05 Rated voltage (kV)

S. No.	Item Description	Installation#1	Installation#2	Installation#3
1.02.06	No. of phases			
1.02.07	No. of poles			
1.02.08	Mounting	* Horizontal/ Vertical	* Horizontal/ Vertical	* Horizontal/ Vertical
1.02.09	Installation	* Indoor/Outdoor	* Indoor/Outdoor	* Indoor/Outdoor
1.02.10	Cylindrical rotor Type	* Yes/No	* Yes/No	* Yes/No
1.02.11	Cooling medium			
	(a) Stator			
	(b) Rotor			
1.02.12	Thermal class of Insulation			
	(a) Stator			
	(b) Rotor			
1.02.13	Date of Commissioning			
1.02.14	Date of Commencement of successful operation			

S. No.	Item Description	Installation#1	Installation#2	Installation#3
2.00.00	Certificate(s) from the Owner that the aforesaid Generator Set is in successful operation for a period of not less than one (1) year prior to date of Techno-Commercial Bid Opening is furnished at Annexure..... to this Attachment			
3.00.00	Documentary evidence in support of QR data is enclosed at Annexure..... to this Attachment			

1.6.0 *M/s....., (Qualified Steam Turbine Generator Manufacturer) are seeking qualification as holding company (singularly or collectively) with subsidiaries (held directly or indirectly) as per notes No.4 for clause no. 1.0.0 of Item No. 4.0 of BDS. The details of subsidiaries meeting the QR are as follows :

1.6.1 *Name, Address, Tele No. of the Subsidiary meeting the QR for Steam Turbine Manufacture as per clause 1.1.0 of Item No. 4.0 of BDS

1.6.2 *Name, Address, Tele No. of the Subsidiary meeting the QR for Generator Manufacture as per clause 1.1.0 of Item No. 4.0 of BDS

1.6.3 *Name, address & Telephone No. of subsidiary company owning the technology for supercritical steam turbine and generators

*We have submitted the experience details in support of Qualifying Requirement at 1.2.0 above with reference to above subsidiary(ies). We are attaching the necessary documentary evidence as Annexure..... of this Attachment establishing the relationship between M/s....., (Qualified Steam Turbine Generator Manufacturer) and above subsidiaries.

*1.7.0 Deed of Joint Undertaking (DJU) executed by us, the Joint Venture (JV) Company, Qualified Steam Turbine Generator Manufacturer, *Qualified Generator Manufacturer, *subsidiaries of Holding Company, *wholly owned subsidiary of the bidder and *Indian manufacturing subsidiary company as per clause 1.5.2 and/or 1.5.3 and/or Note No. 4, 6 & 7 for clause no. 1.0.0 of Item No. 4.0 of BDS is enclosed at Annexure _____ to this Attachment.

1.8.0 Letter to ensure satisfactory performance of Steam Turbine Generator & Auxiliaries as per Note No. 11 for clause no. 1.0.0 of Item No. 4 of BDS as per the format enclosed in the bidding documents is enclosed at Annexure ---------- to this Attachment.

*** Bidder to strike out whichever is not applicable.**

Date :

Place :

(Signature).....

(Printed Name).....

(Designation).....

(Common Seal).....

TURBINE GENERATOR AND ASSOCIATED PACKAGES
FOR
KHURJA SUPER THERMAL POWER PROJECT (2X660 MW)
BIDDING DOCUMENT NO. : THDC/RKSH/CC-9915-371
[Experience details of an Indian Steam Turbine Generator Manufacturer, as per Clause 1.6.0, Item No. 4.0 of BDS]

Bidder's Name and Address:

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

1.0.0 We, M/s....., an Indian Manufacturing company/ Indian Subsidiary Company / Indian JV Company who is a supercritical Steam Turbine Generator Manufacturer, are seeking Qualification as per clause 1.6.0, Item No. 4 of BDS. The details are as follows:

1.1.0 We confirm that we have manufactured / supplied in India Eight (8) Nos. supercritical Steam Turbine Generators, which are in commercial operation (achieved COD) out of which four (4) such Steam Turbine Generators are in commercial operation for at least one year and Performance Guarantee (PG) Test have been successfully completed in any two (2) such Steam Turbine Generators prior to the date of techno-commercial bid opening, as per clause 1.6.1 of Item no. 4 of BDS.

Further, we confirm that in case any problem related to Steam Turbine Generator Sets & Auxiliaries is encountered during execution of the contract, we shall resolve the same within a reasonable time (in the opinion of the owner) by ourself/through our collaborator/through firm having competency to resolve such issues. If the problem is not resolved within a reasonable period of time in the opinion of the owner, Owner shall have the option to approach directly to the collaborator/licensor/technology Provider or any other firm to resolve the issue. In such a case the financial expenditure(s) incurred by Owner for resolution of such issues will be to our account.

Further, we confirm that we shall offer only the type of steam turbine generator for which we are qualified.

The details are furnished as below : -

SN.	Item Description	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5	Unit-6	Unit-7	Unit-8
1.00.00	Name and location of the reference Station in which the unitis located								
1.01.00	Name, address, email, Tel. no. and Fax of owner of the station								
1.01.01	Name and Designation of the responsible person in owner's organisation								
1.01.02	Capacity of Steam Turbine Generator Unit in MW								
1.01.03	Contract No. & Date								
1.01.04	Starting date of project								
1.01.05	Scheduled date of Commissioning								
1.01.06	Actual date of Commissioning								
1.01.07	Date of commencement of successful operation								
1.01.08	Date of commencement of Commercial operation (COD)								
1.01.09	Whether the Steam Turbine Generator is supercritical Yes*/No		*Yes*/No	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*

SN.	Item Description	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5	Unit-6	Unit-7	Unit-8
1.01.10	Scope of work executed by *us / or *associate:								
	a) Manufactured	Yes*/No	*Yes*/No	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*
	b) Supplied	Yes*/No	*Yes*/No	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*
1.01.11	Whether Performance Guarantee Test Successfully completed	Yes*/No	*Yes*/No	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*
1.02.00	Certificate from the Owner of the reference plant that the aforesaid supercritical Steam Turbine Generator Set is in commercial operation (achieved COD) prior to the date of opening of Techno-Commercial Bid. (enclosed at Annexure-…..)	Yes*/No	*Yes*/No	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*
1.02.01	Certificate from the Owner of the reference plant that the aforesaid supercritical Steam Turbine GeneratorSet is in commercial operation for at least one (1) year prior to the date of opening of Techno-Commercial Bid. (enclosed at Annexure-…..)	Yes*/No	*Yes*/No	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*
1.02.02	Certificate from the Owner of the reference plant that the aforesaid supercritical Steam Turbine GeneratorSet has successfully completed								

SN.	Item Description	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5	Unit-6	Unit-7	Unit-8
	Performance Guarantee Tests prior to the date of opening of Techno-Commercial Bid. (enclosed at Annexure-…..)	Yes*/No	*Yes*/No	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*
1.02.03	Documentary evidence in support of QR data is enclosed at Annexure..... to this Attachment								
2.00.00	**Details of Turbine**								
2.01.00	Steam Turbine make								
2.02.00	Tandem compound	Yes*/No	*Yes*/No	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*
2.03.00	No. of Reheat								
2.04.00	(i) No. of Cylinders:								
	(a) HP								
	(b) IP								
	(c) Combined HP-IP								
	(d) LP								
	(ii) Whether HP and IP cylinders are combined or separate								

SN.	Item Description	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5	Unit-6	Unit-7	Unit-8
2.05.00	Module Number								
	(a) HP Turbine								
	(b) IP Turbine								
	(c) Combined HP-IP turbine (if applicable)								
	(d) LP Turbine								
2.06.00	Main steam pressure (gauge)								
2.07.00	Main steam temperature (deg.C)								
2.08.00	Reheat Steam temperature (deg.C)								
2.09.00	Condensing type	Yes*/No	*Yes*/No	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*
2.10.00	Rated speed (RPM) and operating frequency range (Hz)								
2.11.00	No. of Steam Extractions								
2.12.00	Steam Turbine and Generator Directly coupled	Yes*/No*	*Yes*/No	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*

SN.	Item Description	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5	Unit-6	Unit-7	Unit-8
2.13.00	Steam Turbine Generator Set Installation (Indoor / Outdoor)								
3.00.00	**Generator Details**								
3.01.00	Generator make and model No.								
3.02.00	Rated MVA								
3.03.00	Rated Power Factor								
3.04.00	MW rating								
3.05.00	Rated voltage (kV)								
3.06.00	No. of phases								
3.07.00	No. of poles								
3.08.00	Mounting (Horizontal / Vertical)								
3.09.00	Installation (Indoor / Outdoor)								
3.10.00	Cylindrical rotor type	Yes*/No*	*Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No*	Yes*/No**	Yes*/No**	Yes*/No*
3.11.00	Cooling medium								
	(a) Stator								
	(b) Rotor								

SN.	Item Description	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5	Unit-6	Unit-7	Unit-8
3.12.00	Thermal Class of insulation								
	(a) Stator								
	(b) Rotor								
3.13.00	Schedule date of Commissioning								
3.14.00	Actual date of commissioning								
3.15.00	Date of commencement of successful operation								
4.00.00	Documentary evidence in support Of QR data enclosed at Annexure ----------.								
5.00.00	***Letter to ensure satisfactory performance of Steam Turbine Generator & Auxiliaries as per clause no. 1.6.0 of Item No. 4 of BDS as per the format enclosed in the bidding documents is enclosed at Annexure ---------- to this Attachment.***								

*** Bidder to strike out whichever is not applicable.**

Date :

Place :

(Signature).....

(Printed Name).....

(Designation).....

(Common Seal).....

TURBINE GENERATOR AND ASSOCIATED PACKAGES
FOR
KHURJA SUPER THERMAL POWER PROJECT (2 X 660 MW)
BIDDING DOCUMENT NO. : THDC/RKSH/CC- 9915-371

(FORM OF LETTER OF UNDERTAKING TO BE SUBMITTED BY THE BIDDER IN COMPLIANCE TO THE REQUIREMENTS OF CLAUSE 1.1.0 AND 3.0.0, ITEM 4 OF BID DATA SHEET)

LETTER OF UNDERTAKING FOR SUPER CRITICAL STEAM TURBINE GENERATOR SETS TOWARDS PHASED MANUFACTURING PROGRAMME (ON NON JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

Bidder's Name and Address :

To
Corporate Contracts,
THDC India Ltd.,
PragatiBhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

1.0 We, M/s..... (Bidder) is submitting our proposal in response to the Invitation for Bid by the Employer for **Turbine Generator and Associated Packages**for **KhurjaSTPP (2x660 MW)** against the Employer's Bidding Document No. **THDC/RKSH/CC-9915-371.**

2.0 We, M/s _____ (Bidder), hereby undertake that in accordance with the requirement of clause 1.1.0 and 3.0.0 of item no. 4.0 of BDS, we have registered in India under the Companies Act, our company (i.e. M/s.....) / our Subsidiary Company (i.e M/s....., where we are a promotor with .....% equity participation / our Joint Venture (JV) Company (i.e. M/s....., where we are a promotor with .....% equity participation) (hereinafter called the "Indian Manufacturing Company") for manufacturing of super critical Steam Turbine Generator sets in a phased manner as per the Phased Manufacturing Programme elaborated in the bidding document.

*Further our subsidiary company/JV company has registered another manufacturing subsidiary company M/s..... (hereinafter called "Indian Manufacturing Subsidiary Company") in India under companies act for manufacturing of supercritical Steam Turbine Generators in India, in a phased manner as per the Phased Manufacturing Programme elaborated in the bidding documents.

We are enclosing the copy of Board Resolution in this regard at Annexure..... to this Attachment.

2.1 *We M/s..... (Bidder) undertake that we shall submit an **on demand Bank Guarantee of INR 650 Million** as security for any default against meeting the specified Phase Manufacturing Programme (PMP) (in case of award). We understand that in case we

do not implement the PMP even by the overall completion date stated in the bidding documents, the Employer may in his discretion invoke the above Bank Guarantee.

OR

We confirm that we have already given commitments for PMP and submitted bank guarantee(s) for security for default against specified PMP for Steam Turbine Generators to following Central/ State sector Power generating Company for supercritical projects as per following details:

i) .....

ii) .....

(* Continuation Sheets of like size may be used and shall be annexed to this Attachment.)

OR

****We confirm that we have already given commitments for PMP and our submitted bank guarantee(s) for security for default against specified PMP for Steam Turbine Generators to following Central/ State sector Power generating Company have already been released for supercritical projects as per following details*:***

i) .....

ii) .....

(* Continuation Sheets of like size may be used and shall be annexed to this Attachment.)

3.0 We undertake that a valid Technology transfer agreement including license to manufacture and supply in India between M/s _____, a Qualified Steam Turbine Generator Manufacturer or M/s _____ their technology provider (if any), and M/s _____, the Indian Manufacturing Company, is in place covering the type, size and rating of the Steam Turbine Generator sets specified, valid minimum up to the end of the defect liability period of the Contract. The signatory of the technology transfer agreement with the Indian Manufacturing Company owns the technology / have authorization to use and further license the technology

The documentary evidence in support of above is enclosed at Annexure..... to this Attachment.

3.1 We undertake that the technology transfer agreement as above covers transfer of technological know-how for super critical Steam Turbine Generator in the form of completetransfer of design dossier, design software(s), drawings and documentation, quality system manuals and imparting relevant personnel training to the Indian Manufacturing Company M/s _____. We *and Our Associate, further undertake that the above technology transfer agreement has the provision that the transfer of technology to the Indian Manufacturing Company shall be completed by the time last supercritical unit is supplied by us under this tender.

4.0 *We undertake that major part i.e. _____ % of the land required for setting up manufacturing facility in India is in possession with clear title in the name of M/s _____, the Indian manufacturing Company or M/s _____, its Indian promoter (but pledged/leased to M/s _____, the *Subsidiary Company/*JV Company).

OR

*We undertake that we are augmenting our already existing manufacturing facility in India for Manufacturing of Super critical Steam Turbine Generator Sets, for which we confirm that major part i.e. _____ % of the additional land required is in our possession with clear title for augmenting the existing facilities.

Necessary documents confirming the same are enclosed at Annexure ____ to this Attachment.

5.0 We undertake that the subscribed and paid up share capital or Networth of promoters in the Indian Manufacturing Company is INR..... Million as per details hereunder:

Sl.No.	**Name of Promoter**	***Paid up share capital / *Networth**
1		
2		

The undertaking of promoters to enhance the subscribed and paid up share capital or Networthto INR1000 Million prior to the date of award, (in case of award) is attached as Appendix…..... .

For M/s.....
(Bidder/Contractor)

WITNESS :

1. .....

2. .....
(Official Address)

(Signature of the Authorised Representative)

Name.....

(Designation).....

(Common Seal of the Company).....

Note :

1. * Strike out whichever is not applicable.

2. Bidder shall necessarily enclose the documentary evidence establishing that the signatory of the technology transfer agreement with Indian Manufacturing Company own the technology or have the authorization to use and further license the technology.

3. The certificates from a practicing Chartered Accountant shall be submitted by the bidder certifying the amount of subscribed and paid up share capital, or net worth as the case may be as on a date not earlier than 15 days from the date of techno-commercial bid opening / award date as applicable.

Form 13F (Rev.01)

(Format of Letter to ensure satisfactory performance of Steam Turbine Generator & Auxiliaries)

(To be furnished on company Letter Head of the Bidder)

To:

THDC India Limited,
Ganga Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Sub: **Letter to ensure satisfactory performance of Steam Turbine Generator & Auxiliaries for Turbine Generator and Associated Packages for Khurja STPP (2X660MW); Bidding Document No. : THDC/RKSH/CC-9915-371**

Dear Sirs,

This has reference to your IFB reference no. _____ for the captioned package.

We_____ (Name of Bidder) under valid technology transfer agreements for Steam turbine generator with M/s _____(Name of Collaborator*/Licensor*/Technology Provider) confirm that we have acquired technology for supercritical Steam turbine generator. We further confirm that we have fully absorbed the technology regarding design, manufacturing, erection, testing and commissioning for above equipment(s). As per our technology transfer agreement with our *Collaborator/*Licensor/*Technology Provider, we have right to continue the design, manufacturing and supply of these equipment(s) even after expiry of technology transfer agreement.

We confirm that in case of the award of the 'Contract' for the subject package to us, we shall be fully responsible for the satisfactory performance of the Steam Turbine Generator Sets & Auxiliaries covered under the contract. However, in the event any problem is encounteredon Steam Turbine Generator Sets & Auxiliaries during execution of the contract, we shall resolve the same within reasonable time**(in the opinion of the owner)**by ourselves. In case we are not able to resolve the issue ourselves, we agree to first engage our collaborator and (if required) then engage any technical expert / firm having competency to resolve such issues. If still the problem does not get resolved within reasonable period of time**(in the opinion of the owner)**, OWNERhas the option to approach directly to collaborator*/licensor*/technology Provider* or any other party. In such a case the financial expenditure(s) incurred by OWNERafter resolution of such issues will be to our account.

We further confirm that there is no binding arrangement between us and our "*Collaborator*/Licensor/*Technology Provider" and in such a case, we _____ (Name of Bidder) further confirm that we have no objection in OWNER approaching to our *Collaborator/*Licensor/*Technology Provider or any other party directly to resolve the problem.

We, hereby undertake and confirm that this Letter shall be irrevocable and valid upto the end of the defect liability period of the contract.

Signature of Bidder's Authorised signatory: _____
Name _____
Designation _____
Date_____

Common Seal of the Company

Note: Collaborator/Licensor/Technology Provider mean the party from which the 'Bidder' has absorbed the technology under Technology transfer agreement.

*** Strike off whichever is not applicable.**

Amendment No. 11to Bidding Documents[Commercial (Section I, II, III, IV, V & VII)]

Sl. No.	Ref. Clause	Existing Provisions	Amended provisions
1.	**Clause 10.4 (d), Section-II (ITB)**	Installation Services including Erection and Civil & Allied Works (as applicable) shall be quoted separately (Schedule No. 4) and shall include rates or prices for all labour, contractor's equipment, temporary works, materials, consumables and all matters and things of whatsoever nature, charges for insurance covers other than inland transit Insurance including operations and maintenance services, the provision of operations and maintenance manuals, training of employer's personnel, etc., and other services, as identified in the Bidding Documents, as necessary for the proper execution of the Installation Services. Bidders are advised to price their bids in such a manner that Installation Price Component of the bid price (excluding Civil/Structural works price) should not be less than 15% of the cumulative total of FOB Price of Main Equipment indicated in Schedule No.1 and Ex-works Price of Main Equipment indicated in Schedule No.2. In case the Installation Price is below the minimum percentage specified above, the amount by which it is lower shall be retained proportionately from the FOB & Ex-works component of Contract price while releasing payments due on receipt of equipment, and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on pro-rata basis upon completion of installation of the respective equipment	Installation Services including Erection and Civil & Allied Works (as applicable) shall be quoted separately (Schedule No. 4) and shall include rates or prices for all labour, contractor's equipment, temporary works, materials, consumables and all matters and things of whatsoever nature, charges for insurance covers other than inland transit Insurance including operations and maintenance services, the provision of operations and maintenance manuals, training of employer's personnel, etc., and other services, as identified in the Bidding Documents, as necessary for the proper execution of the Installation Services. (i) Bidders are advised to price their bids in such a manner that Installation Price Component of the bid price (excluding Civil/Structural works price) should not be less than 15% and should not be more than 20% of the cumulative total of FOB Price of Main Equipment indicated in Schedule No.1 and Ex-works Price of Main Equipment indicated in Schedule No.2. In case the Installation Price is below the minimum percentage specified above, the amount by which it is lower shall be retained proportionately from the FOB & Ex-Works component of Contract price while releasing payments due on receipt of equipment, and no interest shall be payable on the retained

Sl. No.	Ref. Clause	Existing Provisions	Amended provisions
		and its certification by the Project Manager. (If Prices are quoted in foreign currency then SBI Bills Selling exchange rate as on the date set for opening of Price Bids shall be considered for the purpose of computing installation percentage /retention amount).	amount. The aforesaid retained amount shall be paid on pro-rata basis upon completion of installation of the respective equipment and its certification by the Project Manager. In case the Installation Price is above the maximum percentage specified above, the amount by which it is higher shall be retained while releasing progressive payments due on installation of equipment, and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid along with payment due on completion of Trial Operation / Completion of Facilities. (If Prices are quoted in foreign currency then SBI Bills Selling exchange rate as on the deadline set for submission of Price bids shall be considered for the purpose of computing installation percentage /retention amount). (ii) Bidders are advised to price their bids in such a manner that the Civil Works Price Component of the bid price (including Site Fabricated Structural works price) should not be less than 28% and should not be more than 38% of the cumulative total of FOB Price of Main Equipment indicated in Schedule No.1 and Ex-works Price of Main Equipment indicated in Schedule No.2.

Sl. No.	Ref. Clause	Existing Provisions	Amended provisions
			In case the Civil Works Price (including Site Fabricated Structural works price) is below the minimum percentage specified above, the amount by which it is lower shall be retained proportionately from the FOB & Ex-Works component of Contract price while releasing payments due on dispatch of equipment, and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on pro-rata basis upon completion of Civil Works including Structural works (if any) corresponding to the respective equipment and its certification by the Project Manager. In case the Civil Works Price (including Site Fabricated Structural Works Price) is above the maximum percentage specified above, the amount by which it is higher shall be retained while releasing progressive payments due on completion of civil works (including Site Fabricated Structural works), and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid along with payment due on completion of Trial Operation / Completion of Facilities. (If Prices are quoted in foreign currency then SBI Bills Selling exchange rate as on the deadline set for submission of Price bids shall be considered for the purpose of computing Civil Works percentage /retention amount).

Sl. No.	Ref. Clause	Existing Provisions	Amended provisions
2.	**Clause 9.0 (ITB 39.0), Section-III (BDS)**	Time for Completion of Facilities from the date of Notification of Award shall be **44 & 50** months for Unit 1 & Unit 2 respectively.	Time for Completion of Facilities from the date of Notification of Award shall be 46 & 52 months for Unit 1 & Unit 2 respectively.
3.	**Item No. 9.1, Section-III (BDS)**	Existing Item No. 9.1	Replace the existing Item No. 9.1 as per **Annexure-I.**
4.	**Clause 1 (Definitions), Section-V (SCC)**	**Time for Completion:** "Completion of the Facilities" for Unit-1 & Common System for the project shall be attained within **44** months from the date of Notification of Award. There will be a phase gap of 6 months in completion of facilities for subsequent Units.	**Time for Completion:** "Completion of the Facilities" for Unit-1 & Common System for the project shall be attained within **46** months from the date of Notification of Award. There will be a phase gap of 6 months in completion of facilities for subsequent Units.
5.	**SCC No. 5 (GCC Clause 7.3.1.9), Section-V (SCC)**	The prices of all future requirements of item of spares manufactured by contractor / STG manufacturer beyond 3 years operational requirement will be derived from the corresponding ex-works price at which the order for such spares have been placed by Employer as a part of mandatory spares or recommended spares, or from the rates of mandatory spares or recommended spares as quoted by/negotiated with the Contractor. Ex-works order price of future spares shall be computed in accordance with the price adjustment provisions covered under the main Contract excepting that the base indices will be counted from the scheduled date of Commissioning of the last equipment under the main project and there will be	The prices of all future requirements of item of spares manufactured by contractor / STG manufacturer beyond 3 years operational requirement will be derived from the corresponding Ex-works price at which the order for such spares have been placed by Employer as a part of mandatory spares or recommended spares, or from the rates of mandatory spares or recommended spares as quoted by/negotiated with the Contractor. Ex-works order price of future spares shall be computed in accordance with the price adjustment provisions covered under the main Contract ***and there will be no ceiling on the amount of variation in the prices.*** The above option for procuring future recommended spares by the

Sl. No.	Ref. Clause	Existing Provisions	Amended provisions
		no ceiling on the amount of variation in the prices. The above option for procuring future recommended spares by the Employer shall remain valid for the period of 5 years from the date of Commissioning of the equipment.	Employer shall remain valid for the period of 5 years from the date of Commissioning of the equipment.
6.	**Clause 6 (Time for Commencement and Completion), Section-V (SCC)**	"Completion of Facilities" for Unit-1 & Common System for the Project shall be attained within **44** months from the date of Notification of Award. There will be a gap of 6 months in completion of facilities for subsequent Units.	"Completion of Facilities" for Unit-1 & Common System for the Project shall be attained within **46** months from the date of Notification of Award. There will be a gap of 6 months in completion of facilities for subsequent Units.
7.	**Attachment-3A10 ((Details pertaining to Financial Criteria of Qualification Requirement), Section-VII (Part 1 of 3)**	Existing Attachment-3A10	Replace the existing Attachment-3A10with the revised Attachment-3A10(Rev.01)which is enclosed herewith.
8.	**Attachment-3A11 ((Details pertaining to Financial Criteria ofCollaborator/Associate), Section-VII (Part 1 of 3)**	Existing Attachment-3A11	Replace the existing Attachment-3A11with the revised Attachment-3A11(Rev.01) which is enclosed herewith.
9.	**Attachment-14 (Milestone Schedule), Section-VII (Part 1 of 3)**	Existing Attachment-14(Rev.01)	Replace the existing Attachment-14(Rev.01) with the revised Attachment-14 (Rev.02) which is enclosed herewith.
10.	**Attachment 9(P) (Price Adjustment Data), Section-VII (Part 2 of 3)**	Existing Attachment-9(P)	Replace the existing Attachment-9(P) with the revised Attachment-9P (Rev.01) which is enclosed herewith.

11.	**Appendix-2 (Price Adjustment) to Form No. 5 (Form of Contract Agreement), Section-VII (Book 3 of 3) (Part 1)**	Existing Appendix-2	Replace the existing Appendix-2 with the revised Appendix-2 (Rev.01) which is enclosed herewith.
12.	**Appendix-4 (Time Schedule) to Form No. 5 (Form of Contract Agreement)**	Existing Appendix-4	Replace the existing Appendix-4with the revised Appendix-4 (Rev.01) which is enclosed herewith.

9.1 The programme for supplying, construction, installing, commissioning of plant & equipment, completing the facilities and FOR site delivery of all mandatory spares covered in the package shall be in the form of Master Network identifying the Key phases in various areas of total works, like design, procurement, manufacture and field activities including erection & civil works. In addition, key milestone dates (10-15 nos.) shall also be identified for the complete facilities under the subject package. The Master Network shall conform to the following schedule dates for the key milestones of Unit-I.

1.0 Milestone Schedule for Steam Turbine & Auxiliaries:

Sl. No.	Milestones	Schedule (Month from NOA)	
		Start	Finish
1.	Basic Engineering	-	06
2.	Completion of Detailed Engineering	-	24
3.	Commencement of Manufacturing	10	-
4.	Supply of CW Puddle flange	-	12
5.	Supply of TG embedment	14	
6.	Completion of Ordering of Major BOI (Bought out items)		14
7.	Completion of Ordering Balance BOI (Bought out items)		18
8.	Establishment of Storage facilities, lay down area etc	08	17
9.	Supply of Condenser, TG and other auxiliaries	21	34
10.	Erection and commissioning of EOT crane	20	22
11.	Start of Condenser Erection	23	
12.	Start of TG Erection	24	
13.	Supply of Power Cycle Piping	24	32
14.	Pre-assembly & erection of Power Cycle Piping	28	38
15.	Completion of Major Supplies		32
16.	Completion of Balance Supplies		36
17.	TG Box up		35
18.	Completion of TG Oil Flushing		37
19.	TG on Barring Gear		38
20.	Completion of site delivery of all Mandatory spares		38
21.	Unit Synchronization		42
22.	Full Load operation		44
23.	Completion of Trial Operation		45
24.	Completion of facilities		46

1.1 The above schedule is for Unit#1 only. The phase gap between various activities of subsequent unit (Unit #2) shall be 6 (Six) months, except for engineering activities which shall remain same.

1.2 The term "Supply" denotes receipt of material at site.

1.3 Since the gap between erection & commissioning of two units is six months, unit-wise erection agency deployment shall be discussed during the post-bid discussion based on the construction methodology and erection strategy to be submitted by the bidder in the bid documents. The erection strategy shall include unit-wise deployment schedule and utilization of major Tools & Plants (T&Ps). A suggestive list of T&Ps is annexed herewith. Based on the proposed erection strategy of the Bidder, the details of T&Ps and their deployment schedule shall be finalized during L2 schedule finalization with THDC. However, bidder will have to ensure the deployment of T&Ps as per actual requirement at site to meet the project milestones and implementation schedule.

1.4 The bidder shall deploy 1 no. rack & pinion construction lift in TG hall before commencement of TG erection of Unit#1.

2.0 Milestone Schedule for Other Systems /packages

2.1 The Bidder shall have the overall responsibility for readiness and commissioning of other systems viz AC & ventilation system, Inert Gas system for Control Tower area, C&I works, Electrical systems, associated civil works etc as detailed in specifications to meet the unit-wise milestones and commissioning schedules for achievement of critical milestones of Main plant. The Bidder shall submit detailed work program in the bid inter-alia taking into consideration the milestones to be considered for progressive payment. The broad milestones for other systems are indicated hereunder.

2.2 Schedule **for Award of Other Systems/ Packages:** As infrastructures like construction power, construction lighting, construction water etc (as specified in the scope) and TG & aux civil works including fabrication & installation of Main Power Structure, Pipe Cable Galleries etc are included in the scope of bidder.

2.3 **Civil Packages:**The following civil works packages have been envisaged in the scope of bidder: Civil Works for TG & aux.; ServiceBuilding; CPU & regeneration; cable trestles etc.
The successful bidder have to ensure timely award of the civil works package i.e., within 02nd month of award and suitable mobilization at site for work progress in such a manner that civil inputs are ready for

commencement of works as specified in the work schedule of TG & Auxiliaries and other packages. The bidders have to submit a detail work schedule in line with this work schedule in their bids capturing the readiness of civil inputs/foundation for all majors works, under the scope of contract. The same shall be discussed along with suggestive list of major T&Ps during finalization of L2 schedule.

Milestones for Civil Works of TG & other areas:
The Bidder shall ensure the completion of various equipment foundations, structures, buildings and facilities etc to achieve the milestones for TG & Auxiliaries and other systems as per the schedules.

2.4 Milestone Schedule for AC & Ventilation and Inert Gas System for Control Tower:

Sl. No.	Milestone	Schedule (Month from NOA)
1.	Inert Gas system & Fire detection & alarm system for Control Room, CER, UPS & BatteryChargerRoometc	34
2.	AC & Ventilation works completion for buildings required for Boiler light up viz Unit Control room, CER etc	34
3.	AC & Ventilation, Inert Gas and Fire detection & alarm system works completion for unit synchronization & full load commissioning	39

Note: The above milestones are for Unit#1 and common facilities. The respective milestones for subsequent unit shall have phase gap of 6 months.

2.5 Milestone schedule for Electrical and C&I items:
The bidder shall furnish detailed work program including important milestones like NIT, OBD, Award, Mobilization and commencement of work and readiness of systems for Generator Bus Duct & associated equipments, Power transformers, HT Switchgears for complete plant facilities, LT indoor transformers, Battery chargers, DC Batteries, DG sets, LT switchegars& Bus ducts, Lighting, cabling etc (Covered in scope of bidder's work). Further, the readiness of each system shall be linked with unit-wise readiness of drives/ systems required for Boiler Light up, Unit Synchronization and Commissioning etc. Detailed program submitted by the bidder shall be discussed and finalized during L2 schedule finalization.

3.0 THDC Inputs:

Sl. No.	Input	Schedule (Month from NOA)	
		Unit #1	Unit #2
1.	Land for site office of agency	3	
2.	Construction Power*	First Month at one point to feed ring main to be constructed by Bidder*	
3.	Availability of Steam for Steam Blowing & subsequently Turbine rolling	40	46

** Advance action is to be taken by bidder so that Ring main works start matching with construction activities. It is intended to provide power by THDC at one point of suitable capacity. However, Bidder to deploy sufficient DG sets for piling/ foundations, batching plant, fabrication, erection and Construction activities to meet the construction schedule.*

4.0 Integrated Network:

The bidder shall be required to submit a brief integrated network in line with the major milestone chart given above. The network shall be prepared and submitted in MS Project**/ *Primavera*** format showing all inter activity relationships. A soft copy of the same also may be furnished. Further, the integrated network shall, inter-alia, include at least following activities for each systems showing their inter-relationships between engineering, supply and site execution:

1. Basic Engineering & Drawings
2. Ordering on sub-vendor (wherever applicable)
3. Detailed Engineering & Drawings required to complete the entire package
4. Raw material procurement, fabrication/ manufacturing
5. Testing, Inspection and commencement of sequential dispatch
6. Transportation and receipt at site
7. Completion of dispatch
8. Intermediate milestones/ activities for readiness of Civil fronts.
9. Release of civil foundations/ fronts for equipment erection
10. Completion / achievement of milestones considered for progressive payment (as per bid documents)
11. Trestle / Gallery readiness
12. Progressive readiness of various buildings and other civil structures.
13. Start of erection (area-wise)
14. Intermediate milestones and completion of erection/ installation.
15. Commissioning of the system

5.0 Project Management Plan:

The bidder shall be required to submit his Project Management Plan along with the bid. The main objective of this document is to indicate how various elements of the contract like Engineering, Procurement, Transportation and Site Execution are planned and integrated. This document should be in line with aforesaid integrated network, which inter-alia shall contain following:

a) **Project Management Organization Structure:** Identifying responsibility centers with manpower identified for Engineering, Procurement and Construction supported by write up on methodology for integration of activities.

b) **Site Organization Structure:** Indicating manpower planned for various site functions like Material Management, Erection Management (Discipline wise) including planning, billing, quality, safety etc.

c) **Transportation Logistics:** Identification of ODC consignments and its transportation strategy.

d) **Construction Methodology, Erection Strategy and deployment of T&Ps:**

i) A detailed erection strategy showing sequential erection activities supported by T&P deployment plan indicating quantity and time schedule for deployment, time schedule for finalization of erection agencies etc. T&P list should also include for storage handling of material and its movement at site.

ii) The deployment of T&Ps shall be ensured by the contractor as per actual requirement to meet the project implementation schedule.Based on the proposed erection strategy of the Bidder, the details of T&Ps and their deployment schedule shall be firmed up with the bidder during L2 sch finalization in association with THDC site.

iii) The suggestive lists of major T&Ps for TG & Auxiliaries and Civil Works are enclosed herewith in Annexure.

6.0 Agency for Erection:

Considering the phase gap of six (06) months between the units, the bidder may consider deploying separate construction and erection agency for consecutive units. However the bidder shall submit overall Erection strategy and implementation methodology in terms of Agency deployment unit-wise for Mechanical and civil works. The same shall be deliberated during post-bid discussions & L2 schedule finalization for final acceptance by THDC.

7.0 Detailed (L2) Schedule:

Successful bidder is required to submit a work program within one month of award of contract in the form of Detailed Integrated Network (L2 Schedule) covering details of Engineering, BOI ordering, Procurement, Manufacturing, Shipment / Delivery, Inland Transportation, Erection, Testing and Commissioning activities including inter dependency of activities in line with brief integrated network (submitted in the bids). The L2 Schedule will specify completion /

attainment dates of milestones considered for progressive payment (as per bid documents). The same is to be submitted in hard copy as well as soft copy preferably in Primavera/ Microsoft Project format to THDC for approval.

8.0 Monthly Progress Report:

THDCIL has established an advanced monitoring system using Prima Vera P6 EPPM, for tracking of all Project activities. Successful bidder shall be required to submit Daily Progress Report of civil construction/ erection / installation activities and Monthly Progress Report, every month for all the activities with respect to L2 schedule and the data shall be furnished electronically to THDCIL in such a way that same can be directly accepted and updated with monitoring system maintained by THDCIL.

TURBINE GENERATOR AND ASSOCIATED PACKAGES
FOR
KHURJA SUPER THERMAL POWER PROJECT (2X660 MW)
BIDDING DOCUMENT NO. : THDC/RKSH/CC-9915-371

(Details pertaining to Financial Criteria of Qualification Requirement as per Clause 2.1.0 of Item No. 4.0 of Bid Data Sheet)

A) To satisfy the requirements specified in Clause 2.1.0 of Item No. 4.0 of Bid Data Sheet, Section-III, we give below the following details:

a) In terms of Clause No. 2.1.1, we confirm that our average annual turnover in the preceding three financial years as on date of Techno-commercial bid opening is not less than ₹ **4190 Million (Rupees Four Thousand One Hundred Ninety Million only)** or in equivalent foreign currency. In support of above, we are enclosing Audited Financial Statements.

Sl.No	Financial Year	Amount in Rs.
1.	2016 – 2017	
2.	2017 – 2018	
3.	***2018 – 2019***	
4.	Average Annual Turnover for the preceding three (3) Financial Years as on date of Techno-Commercial Bid Opening.	
5.	We have enclosed Audited financial statements for the last 3 financial years at	Annexure …… to this Attachment
6.	Since we are not able to furnish our audited financial statements, on stand alone entity basis, we are submitting the following documents for substantiation of our Qualification : (a) Copies of unaudited unconsolidated financial statements of the bidder alongwith copies of the audited consolidated financial statements of our Holding Company for the last 3 years enclosed at Annexure……. to this Attachment. (b) Certificate from the CEO/CFO of the Holding company stating that the unaudited unconsolidated financial statements form part of the consolidated Annual Report of the Holding Company, is enclosed as per the format at Appendix-A to this Attachment.	Enclosed at Annexure ……
7.	Audited results for the last financial year as on the date of Techno-Commercial bid opening enclosed In case not enclosed, financial results certified by a practicing chartered accountant enclosed	YES*/NO* YES*/NO*

	In case financial results certified by a practicing chartered accountant not enclosed, then Audited financial statements for FY ***2015-2016*** also enclosed. Further, a Certificate from the CEO/CFO of the Bidder stating that the "Financial results of company are under audit as on the date of Techno-Commercial Bid Opening and the certificate from the practicing chartered accountant certifying the financial parameters is not available", is enclosed at Annexure ……. as per the format at Appendix-C to this Attachment.	Enclosed at Annexure …… YES*/NO* Enclosed at Annexure ……

b) Since we do not satisfy the Financial Criteria stipulated at Clause No. 2.1.1 of Item 4.0 of Bid Data Sheet, Section-III, on our Own, we give below the following details of our **Holding Company** :

1. Name and Address of the Holding Company: **……..**

2. Turnover of the Holding Company with following details:

Sl.No	Financial Year	Amount in INR
a)	2016 – 2017	……..
b)	2017 – 2018	……
c)	***2018 – 2019***	……
d)	Average Annual Turnover for the preceding three (3) Financial Years as on date of Techno-Commercial Bid Opening.	…….
e)	We have enclosed audited Financial Statements for the preceding three (3) Financial years	Annexure …….. to this Attachment

Sl. No	**Description**	**As on last day of the preceding financial year**
3.	Paid-up Share Capital of the Holding Company	……..
4.	Net Worth of the Holding Company	……..
5.	%age of Net worth to Paid-up Share Capital of the Holding Company	……..
6.	A Letter of Undertaking from the Holding Company, supported by Board Resolution of the Holding Company, pledging unconditional and irrevocable financial support for execution of the	

Sl. No	Description	As on last day of the preceding financial year
	contract by the bidder in case of award is enclosed as per the format at Appendix-B to this Attachment. A power of attorney of the person signing on behalf of holding company is also enclosed at Annexure …….. to this Attachment.	
7.	Documentary evidence like Annual Report/Audited financial statements together with relevant schedules for the preceding financial year/ certification of financial statements from a practicing Chartered Accountant etc. in respect of holding company in support of above is enclosed at Annexure…… to this Attachment.	
8.	Audited results for the last financial year as on the date of Techno-Commercial bid opening enclosed	YES*/NO*
	In case not enclosed, financial results certified by a practicing chartered accountant enclosed	YES*/NO* Enclosed at Annexure ……..
	In case financial results certified by a practicing chartered accountant not enclosed, then Audited financial statements for FY ***2015-2016*** also enclosed. Further, a Certificate from the CEO/CFO of the Holding Company stating that the "Financial results of company are under audit as on the date of Techno-Commercial Bid Opening and the certificate from the practicing chartered accountant certifying the financial parameters is not available", is enclosed Annexure ……. as per the format at Appendix-C to this Attachment.	YES*/NO* Enclosed at Annexure …….

B) To satisfy the requirements specified in Clause 2.1.2 of Item No. 4.0 of Bid Data Sheet, Section-III, We give below the following details:

a) We hereby confirm that net worth of our company as on the last day of the preceding financial year is positive.
The Details are as under:

Sl. No	Description	As on last day of the preceding financial year
1.	Net Worth	
2.	Documentary evidence like Audited financial statements for the preceding financial year* in support of above is enclosed at Annexure …….. to this Attachment.	
3.	Since we are not able to furnish our audited financial statements, on stand alone entity basis, we are submitting the following documents for substantiation of our Qualification : (a) Copies of unaudited unconsolidated financial statements of the bidder alongwith copies of the audited consolidated financial statements of our Holding Company for the last 3 years enclosed at Annexure…….. to this Attachment. (b) Certificate from the CEO/CFO of the Holding company stating that the unaudited unconsolidated financial statements form part of the consolidated Annual Report of the Holding Company, is enclosed as per the format at Appendix-A to this Attachment.	Enclosed at Annexure …….
4.	Audited results for the last financial year as on the date of Techno-Commercial bid opening enclosed In case not enclosed, financial results certified by a practicing chartered accountant enclosed In case financial results certified by a practicing chartered accountant not enclosed, then Audited financial statements for FY ***2015-2016*** also enclosed. Further, a Certificate from the CEO/CFO of the Bidder stating that the "Financial results of company are under audit as on the date of Techno-Commercial Bid Opening and the certificate from the practicing chartered accountant certifying the financial is not available", is enclosed Annexure …….. as per the format at Appendix-C to this Attachment.	YES*/NO* YES*/NO* Enclosed at Annexure …… YES*/NO* Enclosed at Annexure ……..

(i) Net worth means the sum total of the paid up share capital and free reserves. Free reserve means all reserves credited out of the profits and share premium account but does not include reserves credited out of the revaluation of the assets, write back of depreciation provision and amalgamation. Further any debit balance of Profit and Loss account and miscellaneous expenses to the extent not adjusted or written off, if any, shall be reduced from reserves and surplus.

(ii) Other income shall not be considered for arriving at annual turnover.

(iii) "Holding Company" and "Subsidiary Company" shall have the meaning ascribed to them as per Companies Act of India.

(iv) For annual Turnover indicated in foreign currency, the exchange rate as on seven (7) days prior to the date of Techno-Commercial bid opening shall be used.

(v) In case the bidder / collaborator(s) / associate(s) participating under Clause 1.3.0 or 1.4.0,do not meet the turnover requirement , then, the Turnover of any of the Promoters individually or all the promoters (in a combined manner) (each having Equity Stake more than 25%) of the Subsidiary Company / JV Company would be considered. Each such promoter of the Subsidiary Company / JV Company shall have to meet the Net Worth criteria individually as per clause 2.1.2 and/or 2.2.2. In such an event the Bidder would be required to furnish along with its techno-commercial bid, a Letter of Undertaking from such promoter(s), supported by Board Resolution as per the format enclosed in the bidding documents, pledging unconditional and irrevocable financial support for execution of the Contract by the Bidder in case of award.

APPENDIX-A
TO ATTACHMENT – 3A10(Rev.01)

PROFORMA OF CERTIFICATE FROM THE CEO/CFO OF THE HOLDING COMPANY IN ACCORDANCE WITH CLAUSE 2.1.3 OF ITEM NO. 4.0 OF BDS

(To be submitted by Bidder alongwith the Techno-Commercial Bid)

Ref. : Date :

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

1.0 I, Mr. ..... (CEO of the Company / CFO of the Company)* declare that M/s. ..... (Name of the Holding Company) is the Holding Company of M/s. ..... (Name of the Bidder).

2.0 I hereby confirm and undertake that the unaudited unconsolidated financial statements submitted in respect of the bidder as part of the bid reference no. ..... dated .....have been considered for the purposes of the finalisation of Consolidated Financial Statements of the Holding Company as part of the Annual Reports.

3.0 I further, certify that the figures in the unaudited unconsolidated financial statements are true and correct and same have been duly reflected in the audited consolidated financial statements and / or Annual Report of the Holding Company.

Yours faithfully

(Signature)

Date : (Name & Designation).....

Place : (Name of the Holding Company) .....

(Seal of Holding Company) .....

Note : ***Strike off whichever is not applicable.

APPENDIX-B
TO ATTACHMENT – 3A10(Rev.01)

PROFORMA OF LETTER OF UNDERTAKING

(TO BE FURNISHED ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

(To be executed by the Holding Company Supported by Board Resolution and submitted by the Bidder alongwith the Techno-Commercial Bid, Applicable to the Bidder for meeting the stipulated Financial Qualifying Requirement as per Clause 2.1.1 of Item No. 4.0 of Bid Data Sheet)

Ref. : Date :

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

1.0 We, M/s..... declare that we are the holding company of M/s ..... (Name of the Bidder) and have controlling interest therein.

M/s. ..... (Name of the Bidder) proposes to submit the bid for the package ..... (Name of the package) for ..... (Name of the Project) under bid reference no. ..... dated ..... and have sought financial strength and support from us for meeting the stipulated Financial Qualifying Requirement as per Clause 2.1.1 of Item 4.0 of Bid Data Sheet.

2.0 We hereby undertake that we hereby pledge our unconditional & irrevocable financial support for the execution of the said package to M/s. ..... (Name of the Bidder), in case they are awarded the Contract for the said package, at the end of the bidding process. We further agree that this undertaking shall be without prejudice to the various liabilities that M/s ..... (Name of Bidder) would be required to undertake in terms of the Contract including the Performance Security as well as other obligations of the Bidder/Contractor.

3.0 This undertaking is irrevocable and unconditional, and shall remain in force till the successful execution and performance of the entire contract and/or till it is discharged by Employer.

4.0 We are herewith enclosing a copy of the Board Resolution in support of this undertaking.

Yours faithfully

(Signature of Authorised Signatory
on behalf of the Holding Company)

Witness :

(1) ..... (Name & Designation).....

(Name of the Holding Company).....

(2) ..... (Seal of the Holding Company).....

Date:

Place:

APPENDIX-C
TO ATTACHMENT – 3A10(Rev.01)

PROFORMA OF CERTIFICATE FROM THE CEO/CFO OF THE COMPANY IN ACCORDANCE WITH ITEM NO. 2.1.3 OF BDS

(To be submitted by Bidder alongwith the Techno-Commercial Bid)

Ref. : Date :

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

1.0 I, Mr. ..... (CEO of the Company / CFO of the Company)* confirm and undertake that the Financial results of the company for the preceding financial year to be submitted in respect of the bidder as part of the bid reference no. ..... dated ..... are under audit as on the date of Techno-Commercial Bid Opening for ……. Package for …….. and the certificate from the practicing chartered accountant certifying the financial parameters for the preceding financial year is not available.

Yours faithfully

(Signature)

Date : (Name & Designation).....

Place : (Name of the Company) .....

(Seal of Company) .....

Note : ***Strike off whichever is not applicable.

TURBINE GENERATOR AND ASSOCIATED PACKAGES
FOR
KHURJA SUPER THERMAL POWER PROJECT (2 X 660 MW)
BIDDING DOCUMENT NO. : THDC/RKSH/CC- 9915-371

(Details pertaining to Financial Criteria of <u>each</u> Collaborator/Associate as per Clause 2.2.0 of Item No. 4.0 of Bid Data Sheet)

A) To satisfy the requirements specified in Clause 2.2.0 of Item No. 4.0 of Bid Data Sheet, Section-III, We give below the following details:

a) In terms of Clause No. 2.2.1, we confirm that the average annual turnover of M/s ……. **[our Associate/Collaborator as per applicable clause / Note .....]** in the preceding three financial years as on date of Techno-commercial bid opening is not less than **INR 2798* / *419 Million** (***Strikeout whichever is not applicable**) or in equivalent foreign currency. In support of above, we are enclosing Audited Financial Statements.

Sl.No	Financial Year	Amount in Rs.
1.	2016 – 2017	
2.	2017 – 2018	
3.	***2018 – 2019***	
4.	Average Annual Turnover for the preceding three (3) Financial Years as on date of Techno-Commercial Bid Opening.	
5.	We have enclosed Audited financial statements for the last 3 financial years at	Annexure …… to this Attachment
6.	Since we are not able to furnish the audited financial statements of our Collaborator / Associate on stand alone entity basis, we are submitting the following documents for substantiation of their Qualification : (a) Copies of unaudited unconsolidated financial statements of our Collaborator / Associate alongwith copies of the audited consolidated financial statements of the Holding Company of our Collaborator / Associate for the last 3 years enclosed at Annexure……. to this Attachment. (b) Certificate from the CEO/CFO of the Holding company stating that the unaudited unconsolidated financial statements form part of the consolidated Annual Report of the Holding Company, is enclosed as per the format at	Enclosed at Annexure ……

	Appendix-A to this Attachment.	
7.	Audited results for the last financial year as on the date of Techno-Commercial bid opening enclosed In case not enclosed, financial results certified by a practicing chartered accountant enclosed In case financial results certified by a practicing chartered accountant not enclosed, then Audited financial statements for FY ***2015-2016*** also enclosed. Further, a Certificate from the CEO/CFO of our Collaborator / Associate stating that the "Financial results of company are under audit as on the date of Techno-Commercial Bid Opening and the certificate from the practicing chartered accountant certifying the financial parameters is not available", is enclosed at Annexure ……. as per the format at Appendix-C to this Attachment.	YES*/NO* YES*/NO* Enclosed at Annexure …… YES*/NO* Enclosed at Annexure ……

b) Since our Collaborator / Associate do not satisfy the Financial Criteria stipulated at Clause No. 2.2.1 of Item 4.0 of Bid Data Sheet, Section-III, on their Own, we give below the following details of the **Holding Company** of our Collaborator / Associate:

1. Name and Address of the Holding Company: ……..

2. Turnover of the Holding Company with following details:

Sl.No	Financial Year	Amount in INR
a)	2016 – 2017	……..
b)	2017 – 2018	……
c)	***2018 – 2019***	……
d)	Average Annual Turnover for the preceding three (3) Financial Years as on date of Techno-Commercial Bid Opening.	…….
e)	We have enclosed audited Financial Statements for the preceding three (3) Financial years	Annexure …….. to this Attachment

Sl. No	**Description**	**As on last day of the preceding financial year**
3.	Paid-up Share Capital of the Holding Company	……..
4.	Net Worth of the Holding Company	……..
5.	%age of Net worth to Paid-up Share Capital of the Holding Company	……..

Sl. No	Description	As on last day of the preceding financial year
6.	A Letter of Undertaking from the Holding Company, supported by Board Resolution of the Holding Company, pledging unconditional and irrevocable financial support to the Collaborator/Associate to honour the terms and conditions of the Deed of Joint Undertaking in case of award of the Contract to the Bidder with whom Collaborator/Associate is associated is enclosed as per the format at Appendix-B to this Attachment. A power of attorney of the person signing on behalf of holding company is also enclosed at Annexure …….. to this Attachment.	
7.	Documentary evidence like Annual Report/Audited financial statements together with relevant schedules for the preceding financial year/ certification of financial statements from a practicing Chartered Accountant etc. in respect of holding company in support of above is enclosed at Annexure…… to this Attachment.	
8.	Audited results for the last financial year as on the date of Techno-Commercial bid opening enclosed	YES*/NO*
	In case not enclosed, financial results certified by a practicing chartered accountant enclosed	YES*/NO* Enclosed at Annexure ……..
	In case financial results certified by a practicing chartered accountant not enclosed, then Audited financial statements for FY ***2015-2016*** also enclosed. Further, a Certificate from the CEO/CFO of the Holding Company stating that the "Financial results of company are under audit as on the date of Techno-Commercial Bid Opening and the certificate from the practicing chartered accountant certifying the financial parameters is not available", is enclosed Annexure ……. as per the format at Appendix-C to this Attachment.	YES*/NO* Enclosed at Annexure …….

B) To satisfy the requirements specified in Clause 2.2.2 of Item No. 4.0 of Bid Data Sheet, Section-III, We give below the following details:

a) We hereby confirm that net worth of our Collaborator/Associate as on the last day of the preceding financial year is positive.
The Details are as under:

Sl. No	Description	As on last day of the preceding financial year
1.	Net Worth	
2.	Documentary evidence like Audited financial statements for the preceding financial year* in support of above is enclosed at Annexure …….. to this Attachment.	
3.	Since we are not able to furnish the audited financial statements of our Collaborator / Associate on stand alone entity basis, we are submitting the following documents for substantiation of their Qualification : (a) Copies of unaudited unconsolidated financial statements of our Collaborator / Associate alongwith copies of the audited consolidated financial statements of the Holding Company of our Collaborator / Associate for the last 3 years enclosed at Annexure……. to this Attachment. (b) Certificate from the CEO/CFO of the Holding company stating that the unaudited unconsolidated financial statements form part of the consolidated Annual Report of the Holding Company, is enclosed as per the format at Appendix-A to this Attachment.	Enclosed at Annexure …….
4.	Audited results for the last financial year as on the date of Techno-Commercial bid opening enclosed In case not enclosed, financial results certified by a practicing chartered accountant enclosed In case financial results certified by a practicing chartered accountant not enclosed, then Audited financial statements for FY ***2015-2016*** also enclosed. Further, a Certificate from the CEO/CFO of our Collaborator / Associate stating that the "Financial results of company are under audit as on the date of Techno-Commercial Bid Opening and the certificate from the practicing chartered accountant certifying the financial is not available", is enclosed at Annexure …….. as per the format at Appendix-C to this Attachment.	YES*/NO* YES*/NO* Enclosed at Annexure …… YES*/NO* Enclosed at Annexure ……..

(i) Net worth means the sum total of the paid up share capital and free reserves. Free reserve means all reserves credited out of the profits and share premium account but does not include reserves credited out of the revaluation of the assets, write back of depreciation provision and amalgamation. Further any debit balance of Profit and Loss account and miscellaneous expenses to the extent not adjusted or written off, if any, shall be reduced from reserves and surplus.

(ii) Other income shall not be considered for arriving at annual turnover.

(iii) "Holding Company" and "Subsidiary Company" shall have the meaning ascribed to them as per Companies Act of India.

(iv) For annual Turnover indicated in foreign currency, the exchange rate as on seven (7) days prior to the date of Techno-Commercial bid opening shall be used.

(v) In case the bidder / collaborator(s) / associate(s) participating under Clause 1.3.0 or 1.4.0, do not meet the turnover requirement , then, the Turnover of any of the Promoters individually or all the promoters (in a combined manner) (each having Equity Stake more than 25%) of the Subsidiary Company / JV Company would be considered. Each such promoter of the Subsidiary Company / JV Company shall have to meet the Net Worth criteria individually as per clause 2.1.2 and/or 2.2.2. In such an event the Bidder would be required to furnish along with its techno-commercial bid, a Letter of Undertaking from such promoter(s), supported by Board Resolution as per the format enclosed in the bidding documents, pledging unconditional and irrevocable financial support for execution of the Contract by the Bidder in case of award.

APPENDIX-A
TO ATTACHMENT – 3A11(Rev.01)

PROFORMA OF CERTIFICATE FROM THE CEO/CFO OF THE HOLDING COMPANY IN ACCORDANCE WITH CLAUSE 2.2.3 OF ITEM NO. 4.0 OF BDS

(To be submitted by Bidder alongwith the Techno-Commercial Bid)

Ref. : Date :

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

1.0 I, Mr. ..... (CEO of the Company / CFO of the Company)* declare that M/s. ..... (Name of the Holding Company) is the Holding Company of M/s. ..... (Name of the Collaborator / Associate of the Bidder).

2.0 I hereby confirm and undertake that the unaudited unconsolidated financial statements submitted in respect of M/s..... (Name of the Associate/Collaborator) as part of the bid reference no. ..... dated .....have been considered for the purposes of the finalisation of Consolidated Financial Statements of the Holding Company as part of the Annual Reports.

3.0 I further, certify that the figures in the unaudited unconsolidated financial statements are true and correct and same have been duly reflected in the audited consolidated financial statements and / or Annual Report of the Holding Company.

Yours faithfully

(Signature)

Date : (Name & Designation).....

Place : (Name of the Holding Company) .....

(Seal of Holding Company) .....

Note : ***Strike off whichever is not applicable.

APPENDIX-B
TO ATTACHMENT – 3A11(Rev.01)

PROFORMA OF LETTER OF UNDERTAKING

(TO BE FURNISHED ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

(To be executed by the Holding Company Supported by Board Resolution and submitted by the Bidder alongwith the Techno-Commercial Bid, Applicable to the Bidder for meeting the stipulated Financial Qualifying Requirement as per Clause 2.2.1 of Item No. 4.0 of Bid Data Sheet)

Ref. : Date :

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

1.0 We, M/s..... declare that we are the holding company of M/s ..... (Name of the Associate/Collaborator) and have controlling interest therein.

M/s. ..... (Name of the Bidder) proposes to submit the bid for the package ..... (Name of the package) for ..... (Name of the Project) under bid reference no. ..... dated ..... and has submitted a deed of joint undertaking with M/s..... (Name of the Associate/Collaborator) of which we are holding company and that M/s..... (Name of the Associate/Collaborator) has sought financial strength and support from us for meeting the stipulated Financial Qualifying Requirement as per Clause 2.2.1 of Item 4.0 of Bid Data Sheet.

2.0 We hereby undertake that we hereby pledge our unconditional & irrevocable financial support to M/s …….. (Name of the Collaborator/Associate) to honour the terms and conditions of the Deed of Joint Undertaking in case of award of the Contract to M/s …….. (Name of the Bidder) with whom M/s …….. (Name of the Collaborator/Associate) is associated. We further agree that this undertaking shall be without prejudice to the various liabilities that M/s ..... (Name of Collaborator/Associate) would be required to undertake in terms of the Contract including the Performance Security, security for Deed of Joint Undertaking as well as other obligations of M/s..... (Name of the Associate/Collaborator).

3.0 This undertaking is irrevocable and unconditional, and shall remain in force till the successful execution and performance of the entire contract and/or till it is discharged by Employer.

4.0 We are herewith enclosing a copy of the Board Resolution in support of this undertaking.

Yours faithfully

(Signature of Authorised Signatory
on behalf of the Holding Company)

Witness :

(1) ..... (Name & Designation).....

(Name of the Holding Company).....

(2) ..... (Seal of the Holding Company).....

Date:

Place:

APPENDIX-C
TO ATTACHMENT – 3A11(Rev.01)

PROFORMA OF CERTIFICATE FROM THE CEO/CFO OF THE COMPANY IN ACCORDANCE WITH ITEM NO. 2.2.3 OF BDS

(To be submitted by Bidder alongwith the Techno-Commercial Bid)

Ref. : Date :

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

1.0 I, Mr. ..... (CEO of the Company / CFO of the Company)* confirm and undertake that the Financial results of the company for the preceding financial year to be submitted in respect of M/s ……. (Name of Collaborator/Associate) of M/s ……. (Name of the bidder) as part of the bid reference no. ..... dated ..... are under audit as on the date of Techno-Commercial Bid Opening for …… Package for …….. and the certificate from the practicing chartered accountant certifying the financial parameters for the preceding financial year is not available.

Yours faithfully

(Signature)

Date : (Name & Designation).....

Place : (Name of the Company) .....

(Seal of Company) .....

Note : *****Strike off whichever is not applicable.

TURBINE GENERATOR AND ASSOCIATED PACKAGES
FOR
KHURJA SUPER THERMAL POWER PROJECT (2 X 660 MW)
BIDDING DOCUMENT NO. : THDC/RKSH/CC- 9915-371
(Milestone Schedule)

Bidder's Name and Address :

To
Corporate Contracts,
THDC India Ltd.,
PragatiBhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

1.0 We declare that the program of furnishing, erecting, testing, commissioning and completion of facilities identifying the key phases in various areas of work like design, procurement, manufacture, field activites including civil construction works as per requirement of Item No. 9 of BDS shall be as per master network (PERT network - L1 Schedule) enclosed as Annexure-I to this Attachment-14.

We, further declare that the completion schedule as per this Master Network shall be followed by us in furnishing and installating the equipments and in furnishing the spares under the Package. As per this Master Network the key milestone dates are as under. The period is commencing from the date of Notification of Award.

Major Activity / Milestone Chart

1.0 Milestone Schedule for Steam Turbine & Auxiliaries:

Sl. No.	Milestones	Schedule (Month from NOA)	
		Start	Finish
1.	Basic Engineering	-	06
2.	Completion of Detailed Engineering	-	24
3.	Commencement of Manufacturing	10	-
4.	Supply of CW Puddle flange	-	12
5.	Supply of TG embedment	14	
6.	Completion of Ordering of Major BOI (Bought out items)		14
7.	Completion of Ordering Balance BOI (Bought out items)		18

Sl. No.	Milestones	Schedule (Month from NOA)	
		Start	Finish
8.	Establishment of Storage facilities, lay down area etc	08	17
9.	Supply of Condenser, TG and other auxiliaries	21	34
10.	Erection and commissioning of EOT crane	20	22
11.	Start of Condenser Erection	23	
12.	Start of TG Erection	24	
13.	Supply of Power Cycle Piping	24	32
14.	Pre-assembly & erection of Power Cycle Piping	28	38
15.	Completion of Major Supplies		32
16.	Completion of Balance Supplies		36
17.	TG Box up		35
18.	Completion of TG Oil Flushing		37
19.	TG on Barring Gear		38
20.	Completion of site delivery of all Mandatory spares		38
21.	Unit Synchronization		42
22.	Full Load operation		44
23.	Completion of Trial Operation		45
24.	Completion of facilities		46

1.1 The above schedule is for Unit#1 only. The phase gap between various activities of subsequent unit (Unit #2) shall be 6 (Six) months, except for engineering activities which shall remain same.

1.2 The term “Supply” denotes receipt of material at site.

1.3 Since the gap between erection & commissioning of two units is six months, unit-wise erection agency deployment shall be discussed during the post-bid discussion based on the construction methodology and erection strategy to be submitted by the bidder in the bid documents. The erection strategy shall include unit-wise deployment schedule and utilization of major Tools & Plants (T&Ps). A suggestive list of T&Ps is annexed herewith. Based on the proposed erection strategy of the Bidder, the details of T&Ps and their deployment schedule shall be finalized during L2 schedule finalization with THDC. However, bidder will have to ensure the deployment of T&Ps as per actual requirement at site to meet the project milestones and implementation schedule.

1.4 The bidder shall deploy 1 no. rack & pinion construction lift in TG hall before commencement of TG erection of Unit#1.

2.0 Milestone Schedule for Other Systems /packages

2.1 The Bidder shall have the overall responsibility for readiness and commissioning of other systems viz AC & ventilation system, Inert Gas system for Control Tower area, C&I works, Electrical systems, associated civil works etc as detailed in specifications to meet the unit-wise milestones and commissioning schedules for achievement of critical milestones of Main plant. The Bidder shall submit detailed work program in the bid inter-alia taking into consideration the milestones to be considered for progressive payment. The broad milestones for other systems are indicated hereunder.

2.2 Schedule for Award of Other Systems/ Packages: As infrastructures like construction power, construction lighting, construction water etc (as specified in the scope) and TG & aux civil works including fabrication & installation of Main Power Structure, Pipe Cable Galleries etc are included in the scope of bidder.

2.3 Civil Packages: The following civil works packages have been envisaged in the scope of bidder: Civil Works for TG & aux.; Service Building; CPU & regeneration; cable trestles etc.

The successful bidder have to ensure timely award of the civil works package i.e., within 02nd month of award and suitable mobilization at site for work progress in such a manner that civil inputs are ready for commencement of works as specified in the work schedule of TG & Auxiliaries and other packages. The bidders have to submit a detail work schedule in line with this work schedule in their bids capturing the readiness of civil inputs/foundation for all majors works, under the scope of contract. The same shall be discussed along with suggestive list of major T&Ps during finalization of L2 schedule.

Milestones for Civil Works of TG & other areas:

The Bidder shall ensure the completion of various equipment foundations, structures, buildings and facilities etc to achieve the milestones for TG & Auxiliaries and other systems as per the schedules.

2.4 Milestone Schedule for AC & Ventilation and Inert Gas System for Control Tower:

Sl. No.	Milestone	Schedule (Month from NOA)
1.	Inert Gas system & Fire detection & alarm system for Control Room, CER, UPS & Battery Charger Room etc	34
2.	AC & Ventilation works completion for buildings required for Boiler light up viz Unit Control room, CER etc	34
3.	AC & Ventilation, Inert Gas and Fire detection & alarm system works completion for unit synchronization & full load commissioning	39

Note: The above milestones are for Unit#1 and common facilities. The respective milestones for subsequent unit shall have phase gap of 6 months.

2.5 Milestone schedule for Electrical and C&I items:

The bidder shall furnish detailed work program including important milestones like NIT, OBD, Award, Mobilization and commencement of work and readiness of systems for Generator Bus Duct & associated equipments, Power transformers, HT Switchgears for complete plant facilities, LT indoor transformers, Battery chargers, DC Batteries, DG sets, LT switchegars& Bus ducts, Lighting, cabling etc (Covered in scope of bidder's work). Further, the readiness of each system shall be linked with unit-wise readiness of drives/ systems required for Boiler Light up, Unit Synchronization and Commissioning etc. Detailed program submitted by the bidder shall be discussed and finalized during L2 schedule finalization.

3.0 THDC Inputs:

Sl. No.	Input	Schedule (Month from NOA)	
		Unit #1	Unit #2
1.	Land for site office of agency	3	
2.	Construction Power*	First Month at one point to feed ring main to be constructed by Bidder*	
3.	Availability of Steam for Steam Blowing & subsequently Turbine rolling	40	46

** Advance action is to be taken by bidder so that Ring main works start matching with construction activities. It is intended to provide power by THDC at one point of suitable capacity. However, Bidder to deploy sufficient DG sets for piling/ foundations, batching plant, fabrication, erection and Construction activities to meet the construction schedule.*

4.0 Integrated Network:

The bidder shall be required to submit a brief integrated network in line with the major milestone chart given above. The network shall be prepared and submitted in MS Project***/Primavera*** format showing all inter activity relationships. A soft copy of the same also may be furnished. Further, the integrated network shall, inter-alia, include at least following activities for each systems showing their inter-relationships between engineering, supply and site execution:

1. Basic Engineering & Drawings
2. Ordering on sub-vendor (wherever applicable)
3. Detailed Engineering & Drawings required to complete the entire package
4. Raw material procurement, fabrication/ manufacturing
5. Testing, Inspection and commencement of sequential dispatch
6. Transportation and receipt at site
7. Completion of dispatch
8. Intermediate milestones/ activities for readiness of Civil fronts.
9. Release of civil foundations/ fronts for equipment erection
10. Completion / achievement of milestones considered for progressive payment (as per bid documents)
11. Trestle / Gallery readiness

12. Progressive readiness of various buildings and other civil structures.
13. Start of erection (area-wise)
14. Intermediate milestones and completion of erection/ installation.
15. Commissioning of the system

5.0 Project Management Plan:

The bidder shall be required to submit his Project Management Plan along with the bid. The main objective of this document is to indicate how various elements of the contract like Engineering, Procurement, Transportation and Site Execution are planned and integrated. This document should be in line with aforesaid integrated network, which inter-alia shall contain following:

a) **Project Management Organization Structure:** Identifying responsibility centers with manpower identified for Engineering, Procurement and Construction supported by write up on methodology for integration of activities.

b) **Site Organization Structure:** Indicating manpower planned for various site functions like Material Management, Erection Management (Discipline wise) including planning, billing, quality, safety etc.

c) **Transportation Logistics:** Identification of ODC consignments and its transportation strategy.

d) **Construction Methodology, Erection Strategy and deployment of T&Ps:**

i) A detailed erection strategy showing sequential erection activities supported by T&P deployment plan indicating quantity and time schedule for deployment, time schedule for finalization of erection agencies etc. T&P list should also include for storage handling of material and its movement at site.

ii) The deployment of T&Ps shall be ensured by the contractor as per actual requirement to meet the project implementation schedule.Based on the proposed erection strategy of the Bidder, the details of T&Ps and their deployment schedule shall be firmed up with the bidder during L2 sch finalization in association with THDC site.

iii) The suggestive lists of major T&Ps for TG & Auxiliaries and Civil Works are enclosed herewith in Annexure.

6.0 Agency for Erection:

Considering the phase gap of six (06) months between the units, the bidder may consider deploying separate construction and erection agency for consecutive units. However the bidder shall submit overall Erection strategy and implementation methodology in terms of Agency deployment unit-wise for Mechanical and civil works. The same shall be deliberated during post-bid discussions & L2 schedule finalization for final acceptance by THDC.

7.0 Detailed (L2) Schedule:

Successful bidder is required to submit a work program within one month of award of contract in the form of Detailed Integrated Network (L2 Schedule) covering details of Engineering, BOI ordering, Procurement, Manufacturing, Shipment / Delivery, Inland Transportation, Erection, Testing and Commissioning activities including inter dependency of activities in line with brief integrated network (submitted in the bids). The L2 Schedule will specify completion / attainment dates of milestones considered for progressive payment (as per bid documents). The same is to be submitted in hard copy as well as soft copy preferably in Primavera/ Microsoft Project format to THDC for approval.

8.0 Monthly Progress Report:

Successful bidder shall be required to submit Monthly Progress Report by 1st week of every month for all the activities with respect to L2 schedule and the data shall be furnished to THDC.

II. We confirm that we have enclosed project management plan alongwith this attachment as per requirement of Item 9 of BDS.

Date : (Signature).....

Place : (Printed Name).....

(Designation).....

(Common Seal).....

TURBINE GENERATOR AND ASSOCIATED PACKAGES
FOR
KHURJA SUPER THERMAL POWER PROJECT (2X660 MW)
BIDDING DOCUMENT NO. THDC/RKSH/CC-9915-371
(Price Adjustment Data)

Bidder's Name and Address:

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

We hereby furnish the relevant details pertaining to the price adjustment provisions in your bidding documents.

1. *FOB/Ex-Works@ Price of Equipments including spares (but Excluding Type Test Charges)*

BIDDERS ARE REQUIRED TO INDICATE SEPARATE INDICES FOR EACH CURRENCY.

*Name of Currency of Bid Price :: .....

Sl. No.	Item	Value of Co-efficient	Name of Published Index and its origin	Value of Indices (as on 30 days prior to date set for Opening of Price Bids).
	Material			
1.	.....#.....	a =	.....	.....
2.	.....#.....	b =	.....	.....
3.	.....#.....	c =	.....	.....
	.....		.....	.....
	.....		.....	.....
	Labour	Lb =		..... .
	Fixed Component	F = 0.15		

Sum of all material co-efficients, i.e. a+b+c+..... etc. indicated above shall be between 0.50 to 0.60.

 # To be specified by Bidder.

@Use separate sheets for FOB/Ex-Works price.

The labour co-efficient shall be between 0.25 to 0.35.

Sum of all material co-efficients and labour coefficient shall be 0.85.

Sum of all material co-efficients, labour coefficient and fixed component should be 1.0

2. Erection Price Component

(a) Indian Field Labour :

The indices used for Indian Field Labour are (i) All India Consumer Price Index for Industrial Workers (All India Monthly Average) published by Labour Bureau, Simla, Government of India and (ii) Arithmetical average of Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular classified Area in which the project site is located or notified by the State Government of the state in which the project site is located, whichever is higher.

(i) The value of the All India Consumer Price Index for Industrial Workers (All India Monthly Average) published by Labour Bureau, as on 30 days prior to the date set for opening of price bids is.....

(ii) The value of the Arithmetical average of Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular classified Area in which the project site is located or notified by the State Government of the state in which the project site is located, whichever is higher, as on 30 days prior to the date set for opening of price bids is.....

(b) **Expatriate Labour :

* Name of currency of Bid Price :

The name of published index and its origin used for expatriate Labour (EF) is.....

3. Structural Work Price Component

Sl. No.	Item	Value of Co-efficient	Name of Published index and its origin	Value of Indices (as on 7 days prior to date set for Opening of price bids).
1.	Fixed Components	F = 0.20		.....
2.	Hot Rolled Coils & Sheets	a = 0.50	Index for "Hot Rolled (HR) Coils & Sheets, including Narrow Strip" under sub-group of "Mild Steel -Flat Products" under Group of "Manufacture of Basic Metals" as published	.....

			by Ministry of Commerce and Industry, GOI
3.	Manufacture of fabricated Metal Products-Structural Metal Product	b = 0.15	Index for "Manufacture of ..... structural metal products" under Group of "Manufacture of Fabricated metal products, except Machinery and Equipment" as published by Ministry of Commerce and Industry, GOI
4.	Labour		
	(i)	0.5 x Lb = 0.5 x 0.15	Consumer price index for ..... industrial workers (All India General) as published by Labour Bureau, Shimla.
	(ii)	0.5 x Lb = 0.5 x 0.15	Arithmetical average of ..... Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular classified Area in which the project site is located or notified by the State Government of the state in which the project site is located, whichever is higher

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4. Civil Works Price Component :

Item	Index	Value of Coefficients	Name of published index and its	Value of Indices (as on 7 days prior to date set for opening of Price bids)
1.	Labour			
	(i)	0.5 x Lb = 0.5 x 0.25	Consumer price index for ..... industrial workers (All India General) as published by Labour Bureau, Shimla.	
	(ii)	0.5 x Lb = 0.5 x 0.25	Arithmetical average of ..... Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular	

			classified Area in which the project site is located or notified by the State Government of the state in which the project site is located, whichever is higher	
2.	Material (excluding cement & steel)	m = 0.15	Index no. of wholesale Price under group "All Commodities" as published by Ministry of Commerce and Industry, GOI	.....
3.	High Speed Diesel	d = 0.05	Price of high speed diesel oil per litre at the Indian Oil Corpn. outlet nearest to the project (selling price inclusive of taxes & duties, if any)	.....
4.	Steel	s = 0.25	Index for "MS Wire Rods" under sub-group of "Mild Steel -Long Products" under Group of "Manufacture of Basic Metals" as published by Mininstry of Commerce and Industry, GOI.	.....
5.	Cement	c = 0.10	Index for "Pozzolana Cement" under sub-group of "Manufacture of cement, lime and plaster" under Group of "Manufacture of other Non-Metallic Mineral Products" as published by Mininstry of Commerce and Industry, GOI.	.....

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5. We agree to provide you with a complete break-up of our Bid Price to enable operation of Price adjustment Clause for aforesaid all price components.

* Continuation sheets of like size & format shall be used, if required, in case number of currencies are more.

****** Continuation sheets of like size and format may be used if countries of origin of expatriate labour are more.

Date : (Signature).....

Place : (Printed Name).....

(Designation).....

(Common Seal).....

Note : Bidder shall note that it is mandatory to furnish the values of various coefficients and name, source & origin of the published indices and its base values in this Attachment-9(P) to Bid. Bidder is also required to mention whether the indices are monthly average, weekly average or as applicable.

PRICE ADJUSTMENT

(i) The Contract price shall be subject to price adjustment during performance of the Contract to reflect changes in the cost of labour and material components etc. in accordance with the provisions described below:

(ii) *The price adjustment provisions shall be applicable separately for price components relating to Supply of Equipment including* ***spare parts****, Installation, Civil and Structural Works, as per price break-up furnished by the Contractor in Schedule-1/ Schedule-2/ Schedule-6 and Schedule-4.* ***The Price Adjustment shall be without any Ceiling.***

(iii) Only following components of the Contract Price will be subject to Price adjustment:

(a) *Ex-Works (India) Price of Plant and Equipment including Mandatory Spares manufactured within the Employer's Country, but excluding Type Tests Charges (covered in Schedule 2) and FOB Price Component for Plant and Equipment including Mandatory Spares supplied from abroad, but excluding Type Tests Charges (covered in Schedule 1).*

(b) Installation Price Component of Contract Price (covered in Schedule 4) consisting of Erection portion.

(c) Civil Works price component of Contract Price (covered in Schedule-4).

(d) Site Fabricated Structural Works price component of Contract Price (covered in Schedule-4).

(e) Ex-Works (India) Price of Recommended Mandatory Spares manufactured within the Employer's Country and FOB Price Component for Recommended Mandatory Spares supplied from abroad (both covered in Schedule 6).

(iv) Price adjustment amounts towards aforesaid components of Contract Price shall be paid in the respective currencies of Contract.

(v) The indices for price adjustment shall necessarily be of the country of origin of goods/labour and shall be well established and nationally recognised in that country. Preferably Government indices shall be used.

(vi) The price adjustment formula for the components of the Contract Price, as mentioned at Sl.No. (iii) above shall be as stipulated hereinafter.

(vii) **Ex-Works/FOB Price Component of Plant and Equipments*****including spares, but excluding Type Tests Charges***

It is understood that the price component of the equipments for any shipment/despatch comprises of a fixed portion (designated as 'F' and the value of which is specified hereunder) and a variable portion linked with the indices for various materials and labour (description and co-efficients as enumerated below).

The amount of price adjustment towards variable portion payable/recoverable on each shipment/despatch shall be computed as under:

$EC = EC_1 - EC_0$

EC_1 will be computed as follows :

$$EC_1 = EC_0\{ F + a \times \frac{A_1}{A_0} \times f_1 + b \times \frac{B_1}{B_0} \times f_2 + c \times \frac{C_1}{C_0} \times f_3 + \ldots\ldots\ldots + Lb \times \frac{L_1}{L_0} \times f_{Lb}\}$$

Where

EC = Adjustment to Ex-Works/FOB Price Component expressed in the currency of the Contract payable to the contractor for each shipment/despatch.

EC_1 = Adjusted Amount of Ex-Works/FOB Price Component expressed in the currency of the Contract payable to the Contractor for each shipment/despatch.

EC_o = Ex-Works / FOB Price for the plant and equipments in the currency of the Contract, shipment/despatchwise.

- The fixed portion of the Ex-Works / FOB Component of the Contract Price (F) shall be 0.15.

- a,b,c etc. shall be co-efficients of major materials/items involved in the Ex-Works / FOB Component of the Contract Price. The sum of these co-efficients shall be between 0.50 to 0.60.

- A,B,C etc. shall be published price indices of corresponding major materials/items. Such indices shall necessarily be of the country of origin of goods.

- 'Lb'' shall be co-efficient for labour component in the Ex-Works/FOB Component of the Contract Price which shall be between 0.25 to 0.35.

  'L' shall be labour index.

- Sum of all the material co-efficients and the labour co-efficient shall be 0.85.

f_1, f_2 f_3, f_{Lb} etc. - f_1, f_2, f_3 etc. are Exchange Rate Correction Factors for the respective materials and f_{Lb} is the Exchange Rate Correction Factor for labour with reference to the currency of the country of origin of index and the respective Contract currency, such that

$$f = \frac{Z_o}{Z_1}$$

where Z is the no. of units of the currency of the country of the origin of index, which is equivalent to one unit of the respective Contract currency. The exchange rates to be used for calculation of factor 'f' shall be as per Bills Selling Exchange Rates established by the STATE BANK OF INDIA.

For the indices, subscript 'o' refers to indices as on 30 days prior to date of opening of Stage-II (Price) bids. For 'Z_0' subscript 'o' refers to value as on the date of opening of Stage-II (Price) bids.

Subscript '1' refers to indices/exchange rates as of :

(a) three months (for Labour Indices) /ninety (90) days (for Exchange Rates) prior to the date of shipment/despatch for labour and Exchange Rates respectively, and

(b) at the expiry of two third (2/3) period from the date of Notification of Award to the date of shipment/despatch, for material.

For the purpose of this clause the date of shipment/despatch shall mean the schedule date of shipment/despatch or actual date of shipment/despatch, whichever is earlier. The schedule date of shipment/despatch shall be as identified in line with provisions of Time Schedule, Appendix-4 to the Contract Agreement.

In case of shipments/dispatches which are delayed beyond the schedule date of shipment/despatch for reasons attributable to the Contractor the price adjustment provision shall not be applicable for the period of time between the schedule date of shipment/despatch and the actual date of shipment/despatch. For this purpose, the schedule date of shipment/despatch shall be as identified in line with provisions of Time Schedule, Appendix-4 to the Contract Agreement.

The above formula for price adjustment will be applicable if the currency in which the Contract Price is expressed is different from the currency of the country of origin of labour and material indices. In other cases, formula shall be applied without the Exchange Rate Correction Factor 'f'.

(viii) **For Installation Price Component (excluding Civil Works and Site Fabricated Structural Works component) of the Contract:**

i) It is understood that the price component for erection portion of Installation Services comprises a fixed portion and variable portion linked with the index of labour (description and co-efficients as enumerated).

The monthly price adjustment amount for the erection portion of Installation Services component will be computed as per the formula given below :

a) Indian Rupee Portion of the Installation Services

ER = ER1 - ERo

ER1 will be computed as follows :

$$\mathbf{ER1 = ERo\ (0.15 + 0.5 \times 0.85\ \frac{L_1}{Lo} + 0.5 \times 0.85\ \frac{W_1}{Wo})}$$

Where :

ER = Adjustment to Erection portion of Installation Services component of contract price expressed in Indian Rupees payable to the contractor for each billing.

ER1 = Adjusted amount of Erection portion of Installation Services component of contract price expressed in Indian Rupees payable to the Contractor.

ER0 = Value of the Erection work done in the billing period, which shall be calculated as under:

For the purpose of computing ERo, each Erection bill (which is excluding initial Advance and amount payable on attainment of full load, on successful completion of Initial Operation and on successful completion of Guarantee test) during the Erection period upto the 'Completion of the Facilities' shall be divided by a factor as indicated below:

$$\frac{\text{Erection portion of Installation Services component of the Contract Price}}{\text{[Initial Advance amount+Erection Portion of Installation Services component of the Contract Price payable on attainment of full load + Erection Portion of Installation Services component of the Contract Price payable on successful completion of Initial Operation + Erection Portion of Installation Services component of the Contract Price payable on successful completion of Guarantee test]}}$$

Erection Portion of Installation Services component of the Contract Price

The payment of price adjustment amount so computed (refer Sr.No. H, Appendix-1) shall be made against a separate invoice, linking the corresponding invoice for Erection Portion of Installation Services payment after retaining the pro-rata amount due on attainment of full load, on successful completion of Initial Operation and on Completion of the Guarantee Test. The amounts so retained shall be paid on attainment of full load, on successful completion of Initial Operation and on successful completion of Guarantee Test respectively.

L = **One of the indices for Indian field labour** Namely, All India Consumer Price Index for Industrial Workers (All India Monthly Average) as published by Labour Bureau, Simla, Government of India.

W = **The other Index for Indian field labour** Namely,**Arithmetical average of Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular classified Area in which the project site is located or notified by the State Government of the state in which the project site is located, whichever is higher**

(b) **Foreign Currency Portion of the Installation Services**

$EE = EE_1 - EE_0$

EE_1 will be computed as follows :

$$EE_1 = EE_0 \left(0.15 + 0.85 \frac{EF_1}{EF_0} \times f\right)$$

Where

EE = Adjustment to Installation Services Component of Contract Price expressed in foreign currency payable to the contractor for each billing.

EE_1 = Adjusted Amount of Installation Services Component of Contract Price expressed in foreign currency payable to the contractor for each billing.

EE_o = Value of foreign currency portion of Erection Work done in the billing period which shall be calculated as under :

For the purpose of computing EE_0, each bill (which is excluding Initial Advance and amount payable on attainment of full load, on successful completion of Initial Operation and on successful Completion of the Guarantee Tests) during the Erection period upto the 'Completion of the Facilities' shall be divided by a factor as indicated below:

$$\frac{\text{Installation Component of the Contract Price}}{\text{Installation Component of the Contract Price}} - \frac{\text{[Initial Advance Amount + Installation Component of the Contract Price payable on attainment of Full Load + Installation Component of the Contract Price payable on successful completion of Initial Operation + Installation Component of the Contract Price payable on successful completion of Guarantee Tests]}}{\text{Installation Component of the Contract Price}}$$

The payment of price adjustment amount so computed (refer S.No. H, Appendix-1) shall be made against a separate invoice, linking the corresponding invoice for Erection Portion of Installation payment after retaining the pro-rata amount due on attainment of Full Load, on successful completion of Initial Operation and on Completion of the Guarantee Tests. The amount so retained shall be paid on attainment of Full Load, on successful completion of Initial Operation and on successful completion of the Guarantee Tests respectively.

EF = Index for Expatriate Field Labour Component of the Erection Price of Installation Work. Such index shall necessarily be of the country of nationality of the labour.

f = Exchange Rate Correction Factor for Expatriate Labour with reference to currency of country of origin of index for expatriate labour and the respective Contract currency, such that

$f = Zo / Z_1$

where Z is the no. of units of the currency of the country of origin of index, which is equivalent to one unit of the respective Contract currency. The exchange rates to be used for calculation of factor 'f' shall be as per Bills Selling Exchange Rates established by the STATE BANK OF INDIA.

For the indices, Subscript 'o' refers to indicesas on 30 days prior to date set for opening of Stage-II (Price) bids.**For 'Z_o', subscript 'o' refers to value as on the date of opening of Stage-II (Price) bids.**

For the indices, subscript '1' refers to the indices as applicable for the month of execution of the erection work. In case there is a revision in the applicable minimum wages during a month, calculation of 'W_1' would take into consideration the weighted average of the applicable wages (wage before revision and wage after revision) and the number of days of applicability of such wages in the month.**For the exchange rates, subscript '1' refers to the exchange rates as applicable on the last day of the month of execution of the erection work.**For the purpose of this clause, month of execution of erection work shall mean the schedule month of execution of the erection work or actual month of execution of the erection work, whichever is earlier. The schedule date for completion of a particular erection activity shall be as identified in line with provisions of Time schedule, Appendix-4 to the Contract Agreement.

The above formula for foreign exchange portion of Installation Component of Contract Price shall be applicable if the currency in which the contract price has been expressed is different from the currency of country of origin of indices for foreign labour. In other cases, the formula shall be applied without exchange rate correction factor 'f'.

In case of erection activities which are delayed beyond the schedule date for reasons attributable to the contractor, the price adjustment provision shall not be applicable for the period of time between the schedule date of completion and actual date of completion of the respective erection activity. For this purpose, the schedule date for completion of a particular erection activity shall be as given above.

(ix) **Site FabricatedStructural Works Price Component**

It is understood that the Structural Works Price Component comprises a fixed portion (designated as 'F' and the value of which is specified hereunder) and variable portion linked with the indices for various materials and labour (description and coefficients as enumerated below).

The amount of price adjustment towards variable portion payable/recoverable shall be computed as follows :

ESW = ESW1 - ESWo

ESW1 will be computed as follows :

$$ESW1 = ESWo \{F + a \times \frac{A_1}{Ao} + b \times \frac{B_1}{Bo} + 0.5 \times Lb \times \frac{L_1}{Lo} + 0.5 \times Lb \times \frac{W_1}{Wo} \}$$

Where,

ESW = Adjustment to Structural Works Price Component expressed in the currency of the Contract.

ESW1 = Adjusted amount of Structural Works Price Component expressed in the currency of the Contract.

For the purpose of computing ESWo, each structural bill (which is excluding initial advance and amount payable on attainment of full load, on successful completion of Initial Operation and on successful Completion of the Guarantee Tests) during the structural work period upto the completion of the facilities' shall be divided by a factor as indicated below :

Structural Component of the contract price - {Initial Advance amount + structural component of the contract price payable on attainment of full load, on successful completion of Initial Operation and on successful Completion of the Guarantee Tests }

Structural Component of the Contract Price

The payment of price adjustment amount so computed (refer S.No. H, Appendix-1) shall be made against a separate invoice, linking the corresponding invoice for Structural Work Portion of Installation payment after retaining the pro-rata amount due on attainment of Full Load, on successful completion of Initial Operation and on Completion of the Guarantee Tests. The amount so retained shall be paid on attainment of Full Load, on successful completion of Initial Operation and on Completion of the Guarantee Tests respectively.

F = The fixed portion of the Structural Works Price Component shall be 0.20.

- a, b shall be co-efficient of major materials/items involved in the Structural Works Price Component of the Contract Price.

- A, B shall be published price indices of corresponding major material/items.

- "Lb" shall be co-efficient for labour component for Structural Works Price Component of Contract Price which shall be 0.15.

    - **L shall be one of the labour indices, namely, Consumer Price Index for Industrial Workers (Gen.) applicable to "All India" as published by Labour Bureau. Shimla of the Govt. of India.**

    - **W shall be the other labour index, which is the Arithmetical average of Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular classified Area in which the project site is located or notified by the State Government of the state in which the project site is located, whichever is higher**

    - Sum of all the material co-efficient and the labour coefficient shall be 0.80.

Subscript '0' refers to indices as on 7 days prior to date set for opening of Stage-II (Price) bids.

For the indices, subscript '1' refers to the indicesas applicable for one month prior to the month of execution of the structural work except "Hot Rolled Coils& Sheets". For 'Hot Rolled Coils& Sheets' the index, '1' refers to the indices as applicable for 90 days prior to the month of execution of the structural work.In case there is a revision in the applicable minimum wages during a month, calculation of 'W_1' would take into consideration the weighted average of the applicable wages (wage before revision and wage after revision) and the number of days of applicability of such wages in the month. For the purpose of this clause, month of execution of structural work shall mean the schedule month of execution of the structural work or actual month of execution of Structural Work, whichever is earlier. The schedule date for completion shall be as identified in line with provisions of Time Schedule, Appendix-4 to the Contract Agreement.

In case of Structural Works activities which are delayed beyond the schedule date for reasons attributable to the contractor, the price adjustment provision shall not be applicable for the period of time between the schedule date of completion and actual date of completion of the respective Structural activity. For this purpose, the schedule date for completion of a particular Structural activity shall be as given above.

(x) **Price adjustment for civil works component of the Contract Price (including construction materials)**

The prices quoted by the bidder shall be base price, which will be subjected to price adjustment in accordance with the conditions and formulaprescribed herein and further subject to satisfying the requirement specified in this clause.

A fixed percentage of the civil works component of the contract price shall be firm and shall not be subject to any price adjustment. The balance portion of the civil works component of the contract price shall be subject to price adjustment on account of changes in materials and labour as detailed below :

CV = CV1 - CVo

CV1 will be computed as follows :

$$CV1 = CVo\left(F + m \times \frac{M_1}{Mo} + d \times \frac{D_1}{Do} + s \times \frac{S_1}{So} + c \times \frac{C_1L_1}{Co\ Lo} + 0.5 \times Lb \times \frac{W_1}{Wo} + 0.5 \times Lb \times \frac{\quad}{\quad}\right)$$

Where,

CV = Adjustment to civil works component expressed in the currency of the contract payable to the contractor for each billing period.

CV1 = Adjusted amount of Civil Works Price Component of contract price i.e. value of work done after application of above price adjustment formula in the billing period.

CVo = Base Value of Civil Works Price Component of contract price, i.e. the value of the Civil work done in the billing period as per the monthly billing schedule for which the price adjustment is to be calculated.

CVoshall be calculated as under:

Each Civil Works bill (which is excluding initial advance and amount payable on attainment of full load, on successful completion of Initial Operation and on successful Completion of the Guarantee Tests) during the Civil Works period upto the 'completion of the facilities' shall be divided by a factor as indicated below :

$$\frac{\text{Civil Works Component of the contract price}}{\text{Civil Works Component of the Contract Price}} - \{\text{Initial Advance amount + Civil Works component of the contract price payable on attainment of Full Load + Civil Works Component of the Contract Price payable on successful completion of Initial Operation + Civil Works Component of the Contract Price payable on successful completion of Guarantee Tests}\}$$

The payment of price adjustment amount so computed (refer S.No. H, Appendix-1) shall be made against a separate invoice, linking the corresponding invoice for Civil Works Portion of Installation payment after retaining the pro-rata amount due on attainment of Full Load, on successful completion of Initial Operation and on Completion of the Guarantee Tests. The amount so retained shall be paid on attainment of Full Load, on successful completion of Initial Operation and on Completion of the Guarantee Tests.

F = Fixed portion of the contract price which will not be subjected to any adjustment under this formula or otherwise which will be 0.20.

m = Coefficient of material (excluding cement & steel) content in the cost of civil portion of the work which will be 0.15.

d = Coefficient of High Speed Diesel Oil (P.O.L) content in the cost of civil portion of the work which will be 0.05.

s = Coefficient of steel content in the cost of civil portion of work which will be 0.25.

c = Coefficient of cement content in the cost of civil portion of work which will be 0.10.

Lb = Coefficient of labour (for all categories) content in the cost of civil portion of the work which will be 0.25.

M = Material Index, namely, Index No. of wholesale price under group. "All commodities" as published by office of the Economic Adviser, Government of India.

D = High Speed Diesel Oil price, namely price of High Speed diesel oil, at Pump Station of India Oil Corporation nearest to the project site. (selling price inclusive of taxes and duties as per litre of H.S.D. Oil).

S = Index for "MS Wire Rods" as published by Ministry of Commerce and Industry, GOI under subgroup "Mild Steel-Long Products" under the group of "Manufacture of Basic Metals".

C = Index for "Pozzolana Cement" as published by Ministry of Commerce and Industry, GOI under subgroup "Manufacture of cement, lime and plaster" under the group of "Manufacture of other Non-Metallic Mineral Products".

L = One of the Labour Indices, namely, Consumer Price Index for Industrial Workers (Gen.) applicable to "All India" as published by Labour Bureau. Shimla of the Govt. of India.

W = The other Labour Index, namely, Arithmetical average of Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular classified Area in which the project site is located or notified by the State Government of the state in which the project site is located, whichever is higher

Subscript

'o' = Refers, to the values of above mentioned labour, material, steel and cement indices, and for diesel price as on 7 days prior to the date of opening of Stage-II (Price) bids.

'1' = Refers to values of corresponding labour, material, steel and cement indices, and for diesel price as applicable for one month prior to month in which the Civil work is executed.

In case there is a revision in the applicable minimum wages during a month, calculation of 'W_1' would take into consideration the weighted average of the applicable wages (wage before revision and wage after revision) and the number of days of applicability of such wages in the month.

For the purpose of this clause, month of execution of civil work shall mean the schedule month of execution of Civil work or actual month of execution of Civil Work, whichever is

earlier. The schedule date for completion shall be as identified in line with provisions of Time Schedule, Appendix-4 to the Contract Agreement.

In case of Civil Works activities which are delayed beyond the schedule date for reasons attributable to the contractor, the price adjustment provision shall not be applicable for the period of time between the schedule date of completion and actual date of completion of the respective Civil Work activity. For this purpose, the schedule date for completion of a particular Civil Work activity shall be as identified in line with provisions of Time Schedule, Appendix-4 to the Contract Agreement.

(xi) The following components of the contract price shall not be subject to price adjustment and shall remain firm during the execution of the contract:

(1) Ocean Freight and Marine Insurance for Plant and Equipment, mandatory spares and recommended spares.

(2) Inland Transportation charges (including Inland Transit Insurance, port clearance, port handling & port charges) for plant & equipment and Spare Parts.

(3) Type Test Charges

(4) Training Charges

(5) Annual Maintenance Contract (AMC) Charges.

(xii) The value of co-efficients and the source of applicable indices and their base values for the purpose of computing price adjustment under the contract shall be as under:

A.*Ex-Works/FOB Price Component of Plant and Equipments including spares, but excluding Type Tests Charges **

S.No.	Item	Value of Coefficient	Name of published index and its origin	Value of Base Date Indices (as on 30 days prior to date of opening of Price bids)
	Fixed Portion	**F=0.15**		
	Material :			
1.		a =		
2.		b =		
3.		c = ...		
4.	Labour :	Lb =		

B. Installation Price Component*

S.No.	Item	Value of Coefficient	Name of published index and its origin	Value of Base Date Indices (as on 30 days prior to date of opening of Price bids)
	Fixed Portion	**F = 0.15**		
	Indian Field Labour			
	(i)	**0.5 x 0.85**	**All India Consumer Price index for industrial workers (All Indian Monthly Average) published by Labour Bureau, Simla, Govt. of India**	
	(ii)	**0.5 x 0.85**	**Arithmetical average of Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular classified Area in which the project site is located or notified by the State Government of the state in which the project site is located, whichever is higher**	
	Expatriate Labour (EF)	0.85		

C. Civil Works Price Component*

Item	Index	Value of Coefficients	Name of published index and its origin	Value of Base date Indices (as on 7 days) prior to date of opening of Price Bids
Fixed Portion		**F = 0.20**		

1.	Labour		
	(i) **0.5 x Lb = 0.5 x 0.25**		Consumer price index for industrial workers (All India General) as published by Labour Bureau, Shimla.
	(ii) **0.5 x Lb = 0.5 x 0.25**		**Arithmetical average of Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular classified Area in which the project site is located or notified by the State Government of the state in which the project site is located, whichever is higher**
2.	Material (excluding cement& steel)	m = 0.15	Index no. of wholesale Price under group "All Commodities" as published by Ministry of Commerce and Industry, GOI
3.	High Speed Diesel	d = 0.05	Price of high speed diesel oil per litre at the Indian Oil Corpn. outlet nearest to the project (selling price inclusive of taxes & duties, if any)
4.	Steel	s = 0.25	Index for "MS Wire Rods" under sub-group of "Mild Steel-Long Products" under Group of "Manufacture of Basic Metals" as published byMinistry of Commerce and Industry, GOI.
5.	Cement	c = 0.10	Index for "Pozzolana Cement" under sub-groupof "Manufacture of cement, lime and plaster" under Group of "Manufacture of other Non-Metallic Mineral Products" as published by Ministry of Commerce and Industry, GOI.

D Site Fabricated Structural Works Price Component*

Item	Coefficient	Value of Coefficients	Name of published index and its origin	Value of Base date Indices (as on 7 days prior to date of opening of Price Bids)
Material :				

a)	Hot Rolled Coils & Sheets	(a)	0.50	Index for "Hot Rolled (HR) Coils & Sheets, including Narrow Strip"under sub-group of "Mild Steel -Flat Products" under Group of "Manufacture of Basic Metals" as published byMininstry of Commerce and Industry, GOI
b)	Manufacture of fabricated Metal Products-Structural Metal Product	(b)	0.15	Index for "Manufacture of structural metal products" under Group of "Manufacture of Fabricated metal products, except Machinery and Equipment" as published by Mininstry of Commerce and Industry, GOI

c) **Labour :**

(i) **0.5 x l = 0.5 x 0.15** Consumer price index for industrial workers (All India General) as published by Labour Bureau, Shimla.

(ii) **0.5 x l = 0.5 x 0.15** **Arithmetical average of Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular classified Area in which the project site is located or notified by the State Government of the state in which the project site is located, whichever is higher**

d) **Fixed Component :** **F_s** **0.20**

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* The above information shall be filled in at the time of Contract Agreement signing based on price adjustment data offered by the bidder in Attachment-9(P) to Bid Form of Price Bids and/or as mutually discussed and agreed upon.

TIME SCHEDULE

1.0 It is clearly understood and agreed that time is the essence of this Contract and shall be strictly adhered to by the Contractor. The program of furnishing, erecting, testing, commissioning and completion of facilities identifying the key phases in various areas of work like design, procurement, manufacture, field activities shall be as per detailed PERT Network enclosed as Annexure-I (the detailed PERT Network submitted by the Bidder as per item no. 9 of Bid Data Sheet and as mutually discussed and agreed before Notification of Award shall be enclosed as Annexure-I to this Appendix-4). As per this detailed PERT Network, the key milestones for completion of facilities are as under:

Major Activity / Milestone Chart

1.0 Milestone Schedule for Steam Turbine & Auxiliaries:

Sl. No.	Milestones	Schedule (Month from NOA)	
		Start	Finish
1.	Basic Engineering	-	06
2.	Completion of Detailed Engineering	-	24
3.	Commencement of Manufacturing	10	-
4.	Supply of CW Puddle flange	-	12
5.	Supply of TG embedment	14	
6.	Completion of Ordering of Major BOI (Bought out items)		14
7.	Completion of Ordering Balance BOI (Bought out items)		18
8.	Establishment of Storage facilities, lay down area etc	08	17
9.	Supply of Condenser, TG and other auxiliaries	21	34
10.	Erection and commissioning of EOT crane	20	22
11.	Start of Condenser Erection	23	

Sl. No.	Milestones	Schedule (Month from NOA)	
		Start	Finish
12.	Start of TG Erection	24	
13.	Supply of Power Cycle Piping	24	32
14.	Pre-assembly & erection of Power Cycle Piping	28	38
15.	Completion of Major Supplies		32
16.	Completion of Balance Supplies		36
17.	TG Box up		35
18.	Completion of TG Oil Flushing		37
19.	TG on Barring Gear		38
20.	Completion of site delivery of all Mandatory spares		38
21.	Unit Synchronization		42
22.	Full Load operation		44
23.	Completion of Trial Operation		45
24.	Completion of facilities		46

1.1 The above schedule is for Unit#1 only. The phase gap between various activities of subsequent unit (Unit #2) shall be 6 (Six) months, except for engineering activities which shall remain same.

1.2 The term “Supply” denotes receipt of material at site.

1.3 Since the gap between erection & commissioning of two units is six months, unit-wise erection agency deployment shall be discussed during the post-bid discussion based on the construction methodology and erection strategy to be submitted by the bidder in the bid documents. The erection strategy shall include unit-wise deployment schedule and utilization of major Tools & Plants (T&Ps). A suggestive list of T&Ps is annexed herewith. Based on the proposed erection strategy of the Bidder, the details of T&Ps and their deployment schedule shall be finalized during L2 schedule finalization with THDC. However, bidder will have to ensure the deployment of T&Ps as per actual requirement at site to meet the project milestones and implementation schedule.

1.4 The bidder shall deploy 1 no. rack & pinion construction lift in TG hall before commencement of TG erection of Unit#1.

2.0 Milestone Schedule for Other Systems /packages

2.1 The Bidder shall have the overall responsibility for readiness and commissioning of other systems viz AC & ventilation system, Inert Gas system for Control Tower area, C&I works, Electrical systems, associated civil works etc as detailed in specifications to meet the unit-wise milestones and commissioning schedules for achievement of critical milestones of Main plant. The Bidder shall submit detailed work program in the bid inter-alia taking into consideration the milestones to be considered for progressive payment. The broad milestones for other systems are indicated hereunder.

2.2 Schedule for Award of Other Systems/ Packages: As infrastructures like construction power, construction lighting, construction water etc (as specified in the scope) and TG & aux civil works including fabrication & installation of Main Power Structure, Pipe Cable Galleries etc are included in the scope of bidder.

2.3 Civil Packages: The following civil works packages have been envisaged in the scope of bidder: Civil Works for TG & aux.; ServiceBuilding; CPU & regeneration; cable trestles etc.

The successful bidder have to ensure timely award of the civil works package i.e., within 02nd month of award and suitable mobilization at site for work progress in such a manner that civil inputs are ready for commencement of works as specified in the work schedule of TG & Auxiliaries and other packages. The bidders have to submit a detail work schedule in line with this work schedule in their bids capturing the readiness of civil inputs/foundation for all majors works, under the scope of contract. The same shall be discussed along with suggestive list of major T&Ps during finalization of L2 schedule.

Milestones for Civil Works of TG & other areas:

The Bidder shall ensure the completion of various equipment foundations, structures, buildings and facilities etc to achieve the milestones for TG & Auxiliaries and other systems as per the schedules.

2.4 **Milestone Schedule for AC & Ventilation and Inert Gas System for Control Tower:**

Sl. No.	Milestone	Schedule (Month from NOA)
1.	Inert Gas system & Fire detection & alarm system for Control Room, CER, UPS & BatteryChargerRoometc	34
2.	AC & Ventilation works completion for buildings required for Boiler light up viz Unit Control room, CER etc	34
3.	AC & Ventilation, Inert Gas and Fire detection & alarm system works completion for unit synchronization & full load commissioning	39

NOTE: The above milestones are for Unit#1 and common facilities. The respective milestones for subsequent unit shall have phase gap of 6 months.

2.5 **Milestone schedule for Electrical and C&I items:**

The bidder shall furnish detailed work program including important milestones like NIT, OBD, Award, Mobilization and commencement of work and readiness of systems for Generator Bus Duct & associated equipments, Power transformers, HT Switchgears for complete plant facilities, LT indoor transformers, Battery chargers, DC Batteries, DG sets, LT switchegars& Bus ducts, Lighting, cabling etc (Covered in scope of bidder's work). Further, the readiness of each system shall be linked with unit-wise readiness of drives/ systems required for Boiler Light up, Unit Synchronization and Commissioning etc. Detailed program submitted by the bidder shall be discussed and finalized during L2 schedule finalization.

3.0 ***THDC INPUTS:***

Sl. No.	**Input**	**Schedule (Month from NOA)**	
		Unit #1	Unit #2
1.	Land for site office of agency	3	
2.	Construction Power*	First Month at one point to feed ring main to be constructed by Bidder*	
3.	Availability of Steam for Steam Blowing & subsequently Turbine rolling	40	46

** Advance action is to be taken by bidder so that Ring main works start matching with construction activities. It is intended to provide power by THDC at one point of suitable capacity. However, Bidder to deploy sufficient DG sets for piling/ foundations, batching plant, fabrication, erection and Construction activities to meet the construction schedule.*

4.0 ***INTEGRATED NETWORK:***

The bidder shall be required to submit a brief integrated network in line with the major milestone chart given above. The network shall be prepared and submitted in MS Project***/Primavera*** format showing all inter activity relationships. A soft copy of the same also may be furnished. Further, the integrated network shall, inter-alia, include at least following activities for each systems showing their inter-relationships between engineering, supply and site execution:

1. Basic Engineering
2. Ordering on sub-vendor (wherever applicable)
3. Detailed Engineering
4. Raw material procurement, fabrication/ manufacturing
5. Testing, Inspection and commencement of sequential dispatch
6. Transportation and receipt at site.
7. Completion of dispatch
8. Intermediate milestones/ activities for readiness of Civil fronts.
9. Release of civil foundations/ fronts for equipment erection
10. Completion/ achievement of milestones considered for progressive payment (as per bid documents)

11. Trestle/ Gallery readiness
12. Progressive readiness of various buildings
13. Start of erection (area-wise)
14. Intermediate milestones and completion of erection
15. Commissioning of the system

5.0 PROJECT MANAGEMENT PLAN:

The bidder shall be required to submit his Project Management Plan along with the bid. The main objective of this document is to indicate how various elements of the contract like Engineering, Procurement, Transportation and Site Execution are planned and integrated. This document should be in line with aforesaid integrated network, which inter-alia shall contain following:

a) **Project Management Organization Structure:** Identifying responsibility centers with manpower identified for Engineering, Procurement and Construction supported by write up on methodology for integration of activities.

b) **Site Organization Structure:** Indicating manpower planned for various site functions like Material Management, Erection Management (Discipline wise) including planning, billing, quality, safety etc.

c) **Transportation Logistics:** Identification of ODC consignments and its transportation strategy.

d) **Construction Methodology, Erection Strategy and deployment of T&Ps:**

i) A detailed erection strategy showing sequential erection activities supported by T&P deployment plan indicating quantity and time schedule for deployment, time schedule for finalization of erection agencies etc. T&P list should also include for storage handling of material and its movement at site.

ii) The deployment of T&Ps shall be ensured by the contractor as per actual requirement to meet the project implementation schedule.Based on the proposed erection strategy of the Bidder, the details of T&Ps and their deployment schedule shall be firmed up with the bidder during L2 sch finalization in association with THDC site.

iii) The suggestive lists of major T&Ps for TG & Auxiliaries and Civil Works are enclosed herewith in Annexure.

6.0 AGENCY FOR ERECTION:

Considering the phase gap of six (06) months between the units, the bidder may consider deploying separate construction and erection agency for consecutive units. However the bidder shall submit overall Erection strategy and implementation methodology in terms of Agency deployment unit-wise for Mechanical and civil works. The same shall be deliberated during post-bid discussions & L2 schedule finalization for final acceptance by THDC.

7.0 DETAILED (L2) SCHEDULE:

Successful bidder is required to submit a work program within one month of award of contract in the form of Detailed Integrated Network (L2 Schedule) covering details of Engineering, BOI ordering, Procurement, Manufacturing, Shipment / Delivery, Inland Transportation, Erection, Testing and Commissioning activities including inter dependency of activities in line with brief integrated network (submitted in the bids). The L2 Schedule will specify completion / attainment dates of milestones considered for progressive payment (as per bid documents). The same is to be submitted in hard copy as well as soft copy preferably in Primavera/ Microsoft Project format to THDC for approval.

8.0 MONTHLY PROGRESS REPORT:

Successful bidder shall be required to submit Monthly Progress Report by 1st week of every month for all the activities with respect to L2 schedule and the data shall be furnished to THDC.

9.0 Detailed Manufacturing Programme

Detailed Manufacturing PERT Network for all the manufacturing activities and Contractor/sub-Contractors works shall also be furnished within 60 days of Notification of Award. The Manufacturing Network shall be supported by detailed procurement programme for critical bought out items / raw materials.

10.0 Pre-Erection Activity Programme

The Erection Network will be supported by detailed Pre-Erection Activity Programme covering the following:

A) Manpower Deployment

B) T&P Mobilisation

C) Detailed Site Mobilisation Plan

10.1 The finalised list of T&P alongwith the schedule of their deployment shall be enclosed as Annexure-II to Appendix-4 of the Contract Agreement.

11.0 Within one week of approval of the Network Schedule, the Contractor shall forward to the Project Manager, copies of the Computer Initial Run-Data. The type of outputs and number of copies of each type to be supplied by the Contractor shall be determined by the Project Manager.

12.0 All the networks shall be updated every month or at a frequency mutually agreed upon. Within seven days following the Monthly Review, a progress meeting shall be held, whenever possible at the works, wherein the major items of the plant or equipments are being produced. The meeting will be attended by the Project Manager and responsible representative of Contractor that the Project Manager considers necessary for the meeting.

13.0 Access to the Contractor's and Sub-Contractor's work shall be granted to the Project Manager at all reasonable times for the purpose of ascertaining the progress

14.0 Phased Manufacturing Programme (PMP)

Various Major Milestones for the Phased Manufacturing Programme (PMP) and their Completion Schedule for Turbine Generator & Associated Packages are as under:

-Sl.No.	Equipment	Indicative Facilities Requirement	To be established latest by (Month from Date of Award)
-1.	Turbine Casings and Valves machining	* LP outer Casing fabrication * HP/IP/LP Casing Machining & blading * Heat Treatment/Stress Relieving * Turbine valve machining & assembly testing	36
-2.	Turbine Rotor machining	* Rotor machining including grooves & Fir Tree machining * Rotor assembly and balancing * Turbine assembly	42
-.	Rotating blades machining	* Rotating Blade machining & finishing	52
-4.	Generator Core and stator manufacturing	* Core stamping, fabrication facility Heat Treatment/Stress Relieving * Generator Stator Fabrication and core building facility * Stator bar manufacturing and heavy machining facility for fabricated Items.	40
-5.	Generator Rotor	* Rotor machining including slotting * Rotor assembly and balancing * Exciter manufacturing & testing * Rotor winding facility	42
-6.	Generator Assembly	* Generator assembly and testing	48

LIST OF MINIMUM T&P AND SAFETY EQUIPMENTS & SAFETY PERSONAL PROTECTIVE EQUIPMENTS TO BE DEPLOYED BY THE CONTRACTOR

(i) Major T&Ps

A list of minimum no. of Major T&P required to be deployed necessarily by the bidder is furnished below. However, the actual deployment at site shall not be limited to these and additional T&P required to meet the work schedule shall be mobilised by the Contractor.

The list of T&P alongwith the Schedule is to be duly filled up by the Bidder to ensure smooth execution of the works at site as per scope of the Contract.

(The list of T&P alongwith the schedule of their deployment, as finalised before notification of Award shall be enclosed here as Appendix-4B to Appendix-4).

(ii) Safety Equipments& Safety Personal Protective Equipments

The list of minimum suggestive Safety Equipments& Safety Personal Protective Equipments to be deployed necessarily by the bidder is furnished below. However, the actual deployment at site shall not be limited to these and additional equipments if required shall be mobilised by the Contractor.

S No	Minimum Suggested List of Safety Equipments and Safety Personal Protective Equipments	Minimum Nos. required
1	Safety Net (Net Size: 10m x 5m, Mesh Size: 25 mm, Mesh Rope: 2mm double cord, Border/Tie Cord: 12mm diameter polypropylene rope (tested as per IS: 5175).Two metres length shall be provided at all four corners.	70
2	**Fall Arrester 'Rope grab fall arrester' & anchorage line.** Anchorage Line: 14mm-16 mm diameter, three strand twisted Polyamide rope. Rope Grab fall arrester: Openable & Guided type Fall Arrestor (on flexible line) conforming EN 353-2 & works on 14-16 mm diameter polyamide rope. material: Nickel Chrome plated Steel Connector: Karbiner conforming to EN 362 (Minimum Strength 22 kN), material: Steel	50 nos. of Rope Grab Fall arrester' and Karbiner each. 10 nos. anchorage line, 30 metre long each, 30 nos. anchorage line, 40 metre long each.
3	**Horizontal life line** Stainless Steel Wire rope of 8mm diameter. Minimum six nos. of steel U-bolt clips are required for clamping each wire rope to a rigid support (03 nos. of U-bolt clips at each end).	50 nos. of wire rope, each 25 metre long.

4	**Ladders on column** The minimum design live load on metallic ladder shall be a single concentrated load of 100 kilo grams. All rungs shall have a minimum diameter of 1.90 centimeters, and minimum clear length of rungs shall be 40.6 centimeters. The distance between rungs shall not exceed 30.5 centimeters. Each ladder shall have maximum height of 9.0 metre. The ladder shall have proper fastenings for attaching it to a column using positive means such as bolt, weld or other type of fasteners.	cumulative length of ladders is 300 metres
5	**Safety PPEs (Industrial Safety helmet & Industrial Safety Shoes)** Industrial Safety Helmet (IS:2925-1984 marked). Industrial Safety Shoes (IS:15298-2002 marked).	525 nos. each

Note:

1. Safety PPEs include Industrial Safety Helmet and Industrial Safety Shoes.

MASTER NETWORK

The Master Network as per para 1.0 of Appendix-4
shall be enclosed as Annexure-I to Appendix-4

INDICATIVE LIST OF T&P TO BE DEPLOYED BY THE CONTRACTOR
(As finalised during discussion with Employer before award)

Sl. No.	Description of T&P	Qty. to be deployed (nos.)

Amendment No. 12 to Bidding Documents Commercial (Section I, II, III, IV, V & VII)

Sl. No.	Ref. Clause	Existing Provisions	Amended provisions
1.	**Clause No. 8 (GCC Clause 13.4, 3rd para), Section-V (SCC)**	Among the Bidders and its associate(s) who have already given commitments for PMP and submitted bank guarantees for security for default against specified PMP for Steam Turbine Generators to any Central / State sector power generating Company for supercritical projects shall not be required to furnish further bank guarantees for security for default against specified PMP.	Bidders who have already given commitments for PMP and submitted bank guarantees for security for default against specified PMP for steam Turbine Generators to any Central / State sector power generating Company for supercritical projects ***or if such bank guarantees have already been released*** shall not be required to furnish further bank guarantees for security for default against specified PMP.
2.	**Attachment-18 (Form Of Letter Of Undertaking For Super Critical Steam Turbine Generator Sets Towards Phased Manufacturing Programme), Section-VII (Part 1 of 3)**	Existing Attachment-18(Rev.01)	Replace the existing Attachment-18 (Rev.01) with the revised Attachment-18 (Rev.02) which is enclosed herewith.

TURBINE GENERATOR AND ASSOCIATED PACKAGES
FOR
KHURJA SUPER THERMAL POWER PROJECT (2 X 660 MW)
BIDDING DOCUMENT NO. : THDC/RKSH/CC- 9915-371

(FORM OF LETTER OF UNDERTAKING TO BE SUBMITTED BY THE BIDDER IN COMPLIANCE TO THE REQUIREMENTS OF CLAUSE 1.1.0 AND 3.0.0, ITEM 4 OF BID DATA SHEET)

LETTER OF UNDERTAKING FOR SUPER CRITICAL STEAM TURBINE GENERATOR SETS TOWARDS PHASED MANUFACTURING PROGRAMME (ON NON JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

Bidder's Name and Address :

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

1.0 We, M/s..... (Bidder) is submitting our proposal in response to the Invitation for Bid by the Employer for **Turbine Generator and Associated Packages** for **Khurja STPP (2x660 MW)** against the Employer's Bidding Document No. **THDC/RKSH/CC-9915-371.**

2.0 We, M/s _____ (Bidder), hereby undertake that in accordance with the requirement of clause 1.1.0 and 3.0.0 of item no. 4.0 of BDS, we have registered in India under the Companies Act, our company (i.e. M/s.....) / our Subsidiary Company (i.e M/s....., where we are a promotor with .....% equity participation / our Joint Venture (JV) Company (i.e. M/s....., where we are a promotor with .....% equity participation) (hereinafter called the "Indian Manufacturing Company") for manufacturing of super critical Steam Turbine Generator sets in a phased manner as per the Phased Manufacturing Programme elaborated in the bidding document.

*Further our subsidiary company/JV company has registered another manufacturing subsidiary company M/s..... (hereinafter called "Indian Manufacturing Subsidiary Company") in India under companies act for manufacturing of supercritical Steam Turbine Generators in India, in a phased manner as per the Phased Manufacturing Programme elaborated in the bidding documents.

We are enclosing the copy of Board Resolution in this regard at Annexure..... to this Attachment.

2.1 *We M/s..... (Bidder) undertake that we shall submit an **on demand Bank Guarantee of INR 650 Million** as security for any default against meeting the specified Phase Manufacturing Programme (PMP) (in case of award). We understand that in case we

do not implement the PMP even by the overall completion date stated in the bidding documents, the Employer may in his discretion invoke the above Bank Guarantee.

OR

We confirm that we have already given commitments for PMP and submitted bank guarantee(s) for security for default against specified PMP for Steam Turbine Generators to following Central/ State sector Power generating Company for supercritical projects as per following details:

i) .....

ii) .....

(* Continuation Sheets of like size may be used and shall be annexed to this Attachment.)

3.0 We undertake that a valid Technology transfer agreement including license to manufacture and supply in India between M/s _____, a Qualified Steam Turbine Generator Manufacturer or M/s _____ their technology provider (if any), and M/s _____, the Indian Manufacturing Company, is in place covering the type, size and rating of the Steam Turbine Generator sets specified, valid minimum up to the end of the defect liability period of the Contract. The signatory of the technology transfer agreement with the Indian Manufacturing Company owns the technology / have authorization to use and further license the technology.

The documentary evidence in support of above is enclosed at Annexure..... to this Attachment.

3.1 We undertake that the technology transfer agreement as above covers transfer of technological know-how for super critical Steam Turbine Generator in the form of complete transfer of design dossier, design software(s), drawings and documentation, quality system manuals and imparting relevant personnel training to the Indian Manufacturing Company M/s _____. We *and Our Associate, further undertake that the above technology transfer agreement has the provision that the transfer of technology to the Indian Manufacturing Company shall be completed by the time last supercritical unit is supplied by us under this tender.

4.0 *We undertake that major part i.e. _____ % of the land required for setting up manufacturing facility in India is in possession with clear title in the name of M/s _____, the Indian manufacturing Company or M/s _____, its Indian promoter (but pledged/leased to M/s _____, the *Subsidiary Company/*JV Company).

OR

*We undertake that we are augmenting our already existing manufacturing facility in India for Manufacturing of Super critical Steam Turbine Generator Sets, for which we confirm that major part i.e. _____ % of the additional land required is in our possession with clear title for augmenting the existing facilities.

Necessary documents confirming the same are enclosed at Annexure ____ to this Attachment.

5.0 We undertake that the subscribed and paid up share capital or Networth of promoters in the Indian Manufacturing Company is INR..... Million as per details hereunder:

Sl.No.	Name of Promoter	Paid up share capital / Networth
1		
2		

The undertaking of promoters to enhance the subscribed and paid up share capital or Networth to INR 1000 Million prior to the date of award, (in case of award) is attached as Appendix…..... .

For M/s.....
(Bidder/Contractor)

WITNESS :

1. ..... (Signature of the Authorised Representative)

2. .....
(Official Address)

Name.....

(Designation).....

(Common Seal of the Company).....

Note :

1. * Strike out whichever is not applicable.

2. Bidder shall necessarily enclose the documentary evidence establishing that the signatory of the technology transfer agreement with Indian Manufacturing Company own the technology or have the authorization to use and further license the technology.

3. The certificates from a practicing Chartered Accountant shall be submitted by the bidder certifying the amount of subscribed and paid up share capital, or net worth as the case may be as on a date not earlier than 15 days from the date of techno-commercial bid opening / award date as applicable.

Amendment No. 13 to Bidding Documents Commercial (Section I, II, III, IV, V & VII)

Sl. No.	Ref. Clause	Existing Provisions	Amended provisions
1.	**Appendix-1 (Terms And Procedures Of Payment) to Form No. 5 (Form of Contract Agreement), Section-VII (Book 3 of 3) (Part 1)**	Existing **Appendix-1**	Replace the existing **Appendix-1** with the revised **Appendix-1** (Rev.01) which is enclosed herewith.

TERMS AND PROCEDURES OF PAYMENT

In accordance with the provisions of GCC Clause 12 (Terms of Payment), the Employer shall pay the Contractor in the following manner and at the following times, on the basis of the Price Break down given in the Section on Price Schedules. Payments will be made in the currencies quoted by the Bidder unless otherwise agreed between the parties. However, applicable taxes, duties and levies shall be reimbursed/paid in local currency. Application for payment in respect of part deliveries may be made by the Contractor as work proceeds.

TERMS OF PAYMENT

A. **Schedule No.1: Plant and Equipments (excluding Mandatory Spares and Type Tests) quoted on CIF (Indian-port-of-entry) basis**

In respect of Plant and Equipments (excluding mandatory spares) supplied from abroad, the following payments shall be made : -

A1. **For FOB Price Component of Plant and Equipments (excluding Mandatory Spares and Type Tests):**

(I) **Ten percent (10%)** of the Total FOB Supply Price Component of Contract Price as Initial Down payment shall be paid as follows:

(i) Acceptance of Notification of Award and Signing of the Contract Agreement.

(ii) Submission of an unconditional Bank Guarantee covering the Down payment amount plus GST as applicable which shall be initially kept valid upto (ninety) 90 days beyond the schedule date of Completion of the Facilities under the Package. However, in case of delay in completion of facilities, the validity of this Bank Guarantee shall be extended by the period of such delay. Proforma of Bank Guarantee is enclosed in Section - VII - Bank Guarantee Form for Down Payment.

(iii) Submission by the Main Contractor of an unconditional Bank Guarantee(s) towards Performance Security(s) in respect of all Contracts (including the Contracts entered into with the Contractor's Assignee, if applicable in case of foreign contractor) and submission by the Assignee (if applicable in case of Foreign Contractor) of an unconditional Bank Guarantee(s) towards Performance Security(s) in respect of all Contracts entered into with the Assignee, all initially valid upto ninety (90) days after the end of Defects Liability Period of all equipments covered under the Contract. The proforma of Bank Guarantee is enclosed in Section-VII-Form of Performance Security.

(iv) Submission of an unconditional Bank Guarantee towards Performance Security for Phased Manufacturing Program (PMP) for Steam Turbine Generator Sets, which shall be initially kept valid upto 90 days beyond the Schedule date of completion of

PMP. However in case of delay in Completion of above, the validity of this Bank Guarantee shall be extended by the period of such delay. Proforma of BG is enclosed in Section-VII-Form of Performance Security regarding Phased Manufacturing Program.

(v) Submission of unconditional Bank Guarantee(s) from all executants of Deed(s) of Joint Undertaking other than Contractor towards faithful performance of the Deed(s) of Joint Undertaking for amount(s) and validity specified in the respective Deed(s) of Joint Undertaking enclosed in Section-VII of Bidding Documents. The proforma of Bank Guarantee(s) shall be as enclosed in Section - VII.

(vi) Submission of a detailed PERT Network based on the Work Schedule stipulated in Appendix - 4 to Form of Contract Agreement and its approval by the Employer.

(II) **Sixty Percent (60%)** of Total FOB Supply Price Component of the Contract Price for each identified equipment upon despatch of equipment from manufacturer's works on pro-rata basis on production of invoices and satisfactory evidence of shipment (which shall be original Bill of Lading) including Material Despatch Clearance Certificate (MDCC) issued by the Employer's Corporate QA & I representative.

(III) **Twenty Percent (20%)** of Total FOB Supply Price Component of the Contract Price for each identified equipment on receipt of equipment at site on pro rata basis and physical verification and certification by the Project Manager for the equipment received and stored at site.

(IV) DELETED

(V) **Deleted**

(VI) (a) **Five Percent (5%)** of FOB Supply Price Component of the contract price on **Successful Completion of Trial/Initial Operation including all associated auxiliaries and ancillary works for Unit-I and completion of common facilities** and issue of Completion Certificate by the Project Manager for Unit-I and common facilities and successful completion of applicable Performance Guarantee Tests and issuance of Operational Acceptance Certificate by the Project Manager.

VI) (b) **Five Percent (5%)** of FOB Supply Price Component of the contract price on **Successful Completion of Trial/Initial Operation including all associated auxiliaries and ancillary works for Unit-II** and issue of Completion Certificate by the Project Manager for Unit-II and successful completion of applicable Performance Guarantee Tests and issuance of Operational Acceptance Certificate by the Project Manager.

Notes: (1) **Full Load is achieving full rated load generation on designated fuel as per the definition of Commissioning, for the purpose of capacity addition.**

(2) **The Initial Operation of the complete Facilities as an integral unit shall be conducted for 720 continuous hours. During the period of initial operation of 720 hours, the unit shall operate continuously at full rated load for a period of not less than 72 hours.**

(3) **The basis for the pro-rata payments at S. No. (II) & (III) above shall be the Billing Break-up (BBU) to be finalised subsequently after award of Contract.**

The Billing Break Up shall be generally on item rate basis. However, for the items which are generally supplied and billed on weight (tonnage) basis, the Billing Break-Up may be considered on weight (tonnage) basis.

(4) In case Installation Price (excluding Civil/Structural works price) is less than 15 % of the cumulative total of FOB & Ex-works Price of Main Equipment, the amount by which it is lower shall be retained proportionately from the FOB & Ex-works component of Contract price while releasing payments due on receipt of equipment, and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on pro-rata basis upon completion of installation of the respective equipment and its certification by the Project Manager.

(If Prices are quoted in foreign currency then SBI Bills Selling exchange rate as on the date set for submission of Price bids shall be considered for the purpose of computing installation percentage /retention amount).

(5) In case the Civil Works Price (including Site Fabricated Structural works price) is less than 28 % of the cumulative total of FOB & Ex-works Price of Main Equipment, the amount by which it is lower shall be retained proportionately from the FOB & Ex-Works component of Contract price while releasing payments due on dispatch of equipment, and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on pro-rata basis upon completion of Civil Works including Structural works (if any) corresponding to the respective equipment and its certification by the Project Manager.

(If Prices are quoted in foreign currency then SBI Bills Selling exchange rate as on the date set for submission of Price bids shall be considered for the purpose of computing Civil Works percentage /retention amount).

A2. **Ocean Freight and Marine Insurance Charges (excluding Mandatory Spares parts) for Plant and Equipments covered in Sl. No. A1 above :**

Hundred Percent (100%) of Ocean Freight and Marine Insurance Charges for plant & equipments (excluding Mandatory Spares) covered in Schedule-1 shall be paid upon shipment on pro-rata basis to the FOB price of the plant and equipments shipped. The aggregate of all such pro-rata payments shall not exceed the total amount identified in the Contract. However, where equipment wise Ocean Freight and Marine Insurance Charges have been identified in the Contract, the payment of Ocean Freight and Marine Insurance Charges shall be based on such charges identified in the Contract against shipment of equipments.

B. **Schedule No. 2 : Plant and Equipments (excluding Mandatory Spares and Type Tests) quoted on Ex-works (India) basis**

In respect of Plant and Equipments (excluding Mandatory Spares) which are manufactured within the Employer's country, the following payment shall be made :

B1. **Ex-works Price Component of Plant and Equipments (excluding Mandatory Spares and Type Tests) :**

(I) **Ten percent (10%)** of the Total Ex-Works Supply Price Component of Contract Price as Initial Down payment shall be paid as follows:

(i) Acceptance of Notification of Award and Signing of the Contract Agreement.

(ii) Submission of an unconditional Bank Guarantee covering the Down payment amount plus GST as applicable on the Down payment to be paid to the contractor which shall be initially kept valid upto (ninety) 90 days beyond the schedule date of Completion of the Facilities under the Package. However, in case of delay in completion of facilities, the validity of this Bank Guarantee shall be extended by the period of such delay. Proforma of Bank Guarantee is enclosed in Section - VII - Bank Guarantee Form for Down Payment.

(iii) Submission by the Main Contractor of an unconditional Bank Guarantee(s) towards Performance Security(s) in respect of all Contracts (including the Contracts entered into with the Contractor's Assignee, if applicable in case of foreign contractor) and submission by the Assignee (if applicable in case of Foreign Contractor) of an unconditional Bank Guarantee(s) towards Performance Security(s) in respect of all Contracts entered into with the Assignee, all initially valid upto ninety (90) days after the end of Defects Liability Period of all equipments covered under the Contract. The proforma of Bank Guarantee is enclosed in Section-VII-Form of Performance Security.

(iv) Submission of an unconditional Bank Guarantee towards Performance Security for Phased Manufacturing Program (PMP) for Steam Turbine Generator Sets, which shall be initially kept valid upto 90 days beyond the Schedule date of completion of PMP. However in case of delay in Completion of above, the validity of this Bank Guarantee shall be extended by the period of such delay. Proforma of BG is enclosed in Section-VII-Form of Performance Security regarding Phased Manufacturing Program.

(v) Submission of unconditional Bank Guarantee(s) from all executants of Deed(s) of Joint Undertaking other than Contractor towards faithful performance of the Deed(s) of Joint Undertaking for amount(s) and validity specified in the respective Deed(s) of Joint Undertaking enclosed in Section-VII of Bidding Documents. The proforma of Bank Guarantee(s) shall be as enclosed in Section - VII.

(vi) Submission of a detailed PERT Network based on the Work Schedule stipulated in Appendix - 4 to Form of Contract Agreement and its approval by the Employer.

(II) **Sixty Percent (60%)** of Total Ex-Works Supply Price Component of the Contract Price for each identified equipment upon despatch of equipment from manufacturer's works on pro-rata basis on production of invoices and satisfactory evidence of shipment (which shall be original Goods Receipt or receipted GR/Rail receipt) including Material Despatch Clearance Certificate (MDCC) issued by the Employer's Corporate QA & I representative.

(III) **Twenty Percent (20%)** of Total Ex-Works Supply Price Component of the Contract Price for each identified equipment on receipt of equipment at site on prorata basis and physical verification and certification by the Project Manager for the equipment received and stored at site.

(IV) **DELETED**

(V) **-Deleted-**

(VI) (a) **Five Percent (5%)** of Ex-Works Supply Price Component of the contract price on **Successful Completion of Trial/Initial Operation including all associated auxiliaries and ancillary works for Unit-I and completion of common facilities** and issue of Completion Certificate by the Project Manager for Unit-I and common facilities and successful completion of applicable Performance Guarantee Tests and issuance of Operational Acceptance Certificate by the Project Manager.

VI) (b) **Five Percent (5%)** of Ex-Works Supply Price Component of the contract price on **Successful Completion of Trial/Initial Operation including all associated auxiliaries and ancillary works for Unit-II** and issue of

Completion Certificate by the Project Manager for Unit-II and successful completion of applicable Performance Guarantee Tests and issuance of Operational Acceptance Certificate by the Project Manager.

Notes: (1) Full Load is achieving full rated load generation on designated fuel as per the definition of Commissioning, for the purpose of capacity addition.

(2) The Initial Operation of the complete Facilities as an integral unit shall be conducted for 720 continuous hours. During the period of initial operation of 720 hours, the unit shall operate continuously at full rated load for a period of not less than 72 hours.

(3) The basis for the pro-rata payments at S. No. (II) & (III) above shall be the Billing Break-up (BBU) to be finalised subsequently after award of Contract.

The Billing Break Up shall be generally on item rate basis. However, for the items which are generally supplied and billed on weight (tonnage) basis, the Billing Break-Up may be considered on weight (tonnage) basis.

(4) In case Installation Price (excluding Civil/Structural works price) is less than 15 % of the cumulative total of FOB & Ex-works Price of Main Equipment, the amount by which it is lower shall be retained proportionately from the FOB & Ex-works component of Contract price while releasing payments due on receipt of equipment, and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on pro-rata basis upon completion of installation of the respective equipment and its certification by the Project Manager.

(If Prices are quoted in foreign currency then SBI Bills Selling exchange rate as on the date set for submission of Price bids shall be considered for the purpose of computing installation percentage /retention amount).

(5) In case the Civil Works Price (including Site Fabricated Structural works price) is less than 28 % of the cumulative total of FOB & Ex-works Price of Main Equipment, the amount by which it is lower shall be retained proportionately from the FOB & Ex-Works component of Contract price while releasing payments due on dispatch of equipment, and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on pro-rata basis upon completion of Civil Works including Structural works (if any) corresponding to the respective equipment and its certification by the Project Manager.

(If Prices are quoted in foreign currency then SBI Bills Selling exchange rate as on the date set for submission of Price bids shall be considered for the purpose of computing Civil Works percentage /retention amount).

C. **Schedule 1, Schedule 2 and Schedule 6: Payment Terms for Mandatory Spares and Recommended Spares (When ordered) quoted on CIF (Indian-Port-of-Entry) / Ex-Works (India) basis :**

The CIF (Indian port-of-entry) price of spares to be supplied from abroad and Exworks (India) price of spares manufactured within the Employer's country shall be paid as under :

(i) **Hundred percent (100%)** of CIF/Ex-works price component of the spares to be paid on pro-rata basis: on receipt and storage at site and on physical verification and certification by the Project Manager for the spares received and stored at site.

D. **Schedule No. 3 : Local Transportation**

a) **All Plant and Equipment including mandatory spares and recommended spares (if ordered)**

Hundred Percent (100%) of Local Transportation charges (including port clearance, port handling and port charges etc., if applicable, and inland transit insurance charges) for the plant and equipment including mandatory spares and also recommended spares (if ordered) shall be paid to the Contractor pro-rata to the value of the equipment/spares received at site and on production of invoices by the Contractor. The aggregate of all such pro-rata payments shall, however, not exceed the total amount identified in the Contract for Local Transportation. However, where item wise local transportation charges (including port clearance, port handling and port charges etc., if applicable, and inland transit insurance charges) have been identified in the Contract, the payment for the same shall be made after receipt of the equipment/spares at site, based on the charges so identified in the Contract.

E. **Schedule No. 4 : Installation Services excluding Civil and Site Fabricated Structural Works Portion**

The Foreign Currency Portion as well as Local Currency Portion of the Total Installation Services Component of the Contract Price of Plant and Equipment (excluding Civil and Site Fabricated Structural Works Portion) shall be paid as under :

(IA) Five Percent (5%) of the total Installation Services component of the Contract Price (excluding Civil and Site Fabricated Structural Works Portion) will be paid to the Contractor as interest bearing down payment on:

(i) Acceptance of Notification of Award and Signing of Contract Agreement.

(ii) Establishing their office at site preparatory to mobilisation of their erection establishment.

(iii) Submission of an unconditional Bank Guarantee for an amount equivalent to one hundred ten percent (110%) of the Down payment amount plus GST as applicable on the Down payment to be paid to the contractor, which shall be initially kept valid upto ninety (90) days beyond the schedule date for Completion of the last Facility covered under the Package. However, in case of delay in completion of the facilities covered under the package, the validity of this Down payment Bank Guarantee shall be extended by the period of such delay. The proforma of the Bank Guarantee is enclosed in Section-VII-Bank Guarantee Form for Down Payment.

(iv) Submission by the Main Contractor of an unconditional Bank Guarantee(s) towards Performance Security(s) in respect of all Contracts (including the Contracts entered into with the Contractor's Assignee, if applicable in case of foreign contractor) and submission by the Assignee (if applicable in case of Foreign Contractor) of an unconditional Bank Guarantee(s) towards Performance Security(s) in respect of all Contracts entered into with the Assignee, all initially valid upto ninety (90) days after the end of Defects Liability Period of all equipments covered under the Contract. The proforma of Bank Guarantee is enclosed in Section-VII-Form of Performance Security.

(v) Submission of an unconditional Bank Guarantee towards Performance Security for Phased Manufacturing Program (PMP) for Steam Turbine Generator Sets, which shall be initially kept valid upto 90 days beyond the Schedule date of completion of PMP. However in case of delay in Completion of above, the validity of this Bank Guarantee shall be extended by the period of such delay. Proforma of BG is enclosed in Section-VII-Form of Performance Security regarding Phased Manufacturing Program.

(vi) Submission of unconditional Bank Guarantee(s) from all executents of Deed(s) of Joint Undertaking other than Contractor towards faithful performance of the Deed(s) of Joint Undertaking for amount(s) and validity specified in the respective Deed(s) of Joint Undertaking enclosed in Section-VII of Bidding Documents. The proforma of Bank Guarantee(s) shall be as enclosed in Section - VII.

(vii) Submission of a detailed PERT Network based on the work schedule stipulated in Appendix - 4 to the Form of Contract Agreement and its approval by the Employer.

(viii) Down Payment for Installation services price components shall be released after certification of Engineer-in-Charge that the Contractor has brought to site the Safety equipments & Safety Personal Protective Equipments as per minimum quantity specified in the Bidding Documents.

In case the Contractor decides not to take Down payment, the first progressive payment for Installation services price component shall be released after certification of Engineer-in-Charge that the Contractor has brought to site the Safety equipments & Safety Personal Protective Equipments as per minimum quantity specified in the Bidding Documents.

(IB) Further, Five Percent (5%) of the total installation services component of the Contract Price (excluding Civil Works and structural works Portion) will be paid to the Contractor as interest bearing down payment on :

(i) Fulfillment of Conditions mentioned at E(IA)(i) to (viii) above

(ii) Submission of an unconditional Bank Guarantee for an amount equivalent to one hundred ten percent (110%) of the Down payment amount plus GST as applicable on the Down payment to be paid to the contractor, which shall be initially kept valid upto ninety (90) days beyond the schedule date for Completion of the last Facility covered under the Package. However, in case of delay in completion of the facilities covered under the package, the validity of this Down payment Bank Guarantee shall be extended by the period of such delay. The proforma of the Bank Guarantee is enclosed in Section-VII-Bank Guarantee Form for Down Payment.

(iii) Finalisation of Installation/Erection Agency and Submission of copy of purchase order/contract placed by Contractor and duly accepted by Installation/Erection Agency and T&P & manpower mobilization as identified alongwith PERT Network for start of erection and certification thereof by the Engineer-in-Charge.

(IC) The recovery of the interest component on the Down payment amount shall be made from the progressive payments released to the Contractor as per Clause E(II) of APPENDIX-I to Form of Contract Agreement, Section-VII. The amount of interest to be recovered from a particular bill shall be calculated **@ 1.2% loading on State Bank of India MCLR (3 years) (applicable on the date of Down payment) per annum** on the value of Down payment corresponding to the %age of total progressive payment being released. The period for which the interest is to be calculated shall be reckoned from the date of release of the Down payment to the actual date of release of the said progressive payment or the expiry of the stipulated time frame for release of such progressive payments under the contract, whichever is earlier. The interest on the

Down payment shall stand fully recovered on release of all the progressive payments. If the amount payable under any interim bill is not sufficient to cover all deductions to be made for interest on the Down payment and other sums deductible therefrom, the balance outstanding shall be recovered from the next payments immediately falling due.

Note: In case the contractor decides not to take interest bearing Down payment, the Down payment shall be proportionately adjusted in the progressive payment of 80%.

(II) **Eighty Percent (80%)** of the Installation Services component of Contract Price (excluding Civil and Site Fabricated Structural works) shall be paid on pro-rata basis against progressive erection of the identified equipment on certification by the Project Manager for the quantum of work completed and on certification by the Project Manager's field quality assurance & surveillance representative for the successful completion of quality check points involved in the quantum of work.

Note: The release of first progressive payment for installation services shall also be subject to submission of documentary evidence by the Contractor towards having taken the insurance policy(ies) in terms of relevant provisions of GCC Clause 34 (Insurance) and acceptance of same by the Project Manager.

(III) -Deleted-

(IV) -Deleted-

(V) (a) **Five Percent (5%)** of total Installation Services Component of Contract Price (excluding Civil and Site Fabricated Structural Works) on **Successful Completion of Trial/Initial Operation including all associated auxiliaries and ancillary works for Unit-I and completion of common facilities** and issue of Completion Certificate by the Project Manager for Unit-I and common facilities and successful completion of applicable Performance Guarantee Tests and issuance of Operational Acceptance Certificate by the Project Manager.

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V) (b) **Five Percent (5%)** of total Installation Services Component of Contract Price (excluding Civil and Site Fabricated Structural Works) on **Successful Completion of Trial/Initial Operation including all associated auxiliaries and ancillary works for Unit-II** and issue of Completion Certificate by the Project Manager for Unit-II and successful completion of applicable Performance Guarantee Tests and issuance of Operational Acceptance Certificate by the Project Manager.

Note: (1) -Deleted-

(2) The Initial Operation of the complete Facilities as an integral unit shall be conducted for 720 continuous hours. During the period of initial operation of 720 hours, the unit shall operate continuously at full rated load for a period of not less than 72 hours.

(3) In case, Installation Services component of Contract Price includes foreign currencies, the payment at each stage as above, shall be made in the stated currencies on proportionate basis for the items of work involving foreign currency.

The basis for the pro-rata payments at Sl.No. (II) above shall be the Billing Break up to be finalised subsequently.

(4) In case the Installation Price (excluding Civil/Structural works price) is more than 20 % of the cumulative total of FOB & Ex-works Price of Main Equipment, the amount by which it is higher shall be retained while releasing progressive payments due on installation of equipment, and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid along with payment due on completion of Trial Operation / Completion of Facilities.

(If Prices are quoted in foreign currency then SBI Bills Selling exchange rate as on the date set for submission of Price bids shall be considered for the purpose of computing installation percentage /retention amount).

F. Schedule No. 4 : Civil Works

The Civil Works Price Component of the Contract Price shall be paid as under :

(I)(a) **Five (5%)** of the total Civil Works Price component of the Contract Price will be paid to the Contractor **as interest bearing Down** payment on:

(i) Acceptance of Notification of Award and Signing of Contract Agreement.

(ii) Establishment of their office at site in preparatory to commencement of Civil Works.

(iii) Submission of an unconditional Bank Guarantee for an amount equivalent to one hundred ten percent (110%) of the Down payment amount plus GST as applicable on the Down payment to be paid to the contractor, which shall be initially kept valid upto ninety (90) days beyond the schedule date for Completion of the last Facility covered under the Package. However, in case of delay in completion of the facilities covered under the package, the validity of this Down

payment Bank Guarantee shall be extended by the period of such delay. The proforma of the Bank Guarantee is enclosed in Section-VII-Bank Guarantee Form for Down Payment.

(iv) Submission by the Main Contractor of an unconditional Bank Guarantee(s) towards Performance Security(s) in respect of all Contracts (including the Contracts entered into with the Contractor's Assignee, if applicable in case of foreign contractor) and submission by the Assignee (if applicable in case of Foreign Contractor) of an unconditional Bank Guarantee(s) towards Performance Security(s) in respect of all Contracts entered into with the Assignee, all initially valid upto ninety (90) days after the end of Defects Liability Period of all equipments covered under the Contract. The proforma of Bank Guarantee is enclosed in Section-VII-Form of Performance Security.

(v) Submission of an unconditional Bank Guarantee towards Performance Security for Phased Manufacturing Program (PMP) for Steam Turbine Generator Sets, which shall be initially kept valid upto 90 days beyond the Schedule date of Completion of PMP. However in case of delay in Completion of above, the validity of this Bank Guarantee shall be extended by the period of such delay. Proforma of BG is enclosed in Section-VII-Form of Performance Security regarding Phased Manufacturing Program.

(vi) Submission of unconditional Bank Guarantee(s) from all executents of Deed(s) of Joint Undertaking other than Contractor towards faithful performance of the Deed(s) of Joint Undertaking for amount(s) and validity specified in the respective Deed(s) of Joint Undertaking enclosed in Section-VII of Bidding Documents. The proforma of Bank Guarantee(s) shall be as enclosed in Section - VII.

(vii) Submission of a detailed PERT Network based on the work schedule stipulated in Appendix-4 to Form of the Contract Agreement and its approval by the Employer.

(viii) Down Payment for Civil works price components shall be released after certification of Engineer-in-Charge that the Contractor has brought to site the Safety equipments & Safety Personal Protective Equipments as per minimum quantity specified in the Bidding Documents.

In case the Contractor decides not to take Down payment, the first progressive payment for Civil works price component shall be released after certification of Engineer-in-Charge that the Contractor has brought to site the Safety equipments & Safety Personal Protective Equipments as per minimum quantity specified in the Bidding Documents.

(I)(b) **Further, Five Percent (5%)** of the total Civil Works Price component of the Contract Price will be paid to the Contractor **as interest bearing Down** payment on :

(i) Fulfillment of conditions mentioned at F(I) (a)(i) to (viii) above

(ii) Submission of an unconditional Bank Guarantee for an amount equivalent to one hundred ten percent (110%) of the Down payment amount plus GST as applicable on the Down payment to be paid to the contractor, which shall be initially kept valid upto ninety (90) days beyond the schedule date for Completion of the last Facility covered under the Package. However, in case of delay in completion of the facilities covered under the package, the validity of this Down payment Bank Guarantee shall be extended by the period of such delay. The proforma of the Bank Guarantee is enclosed in Section-VII-Bank Guarantee Form for Down Payment.

(iii) Finalisation of Civil Agency and submission of copy of purchase order/contract placed by Contractor and duly accepted by Civil Agency and T&P & manpower mobilization as identified alongwith PERT Network for start of Civil works and certification thereof by the Engineer-in-Charge.

(I)(c) The recovery of the interest component on the above Down payment amount shall be made from the progressive payments released to the contractor as per clause F(II) of Appendix-1 to Form of Contract Agreement, Book 3 of 3, Section-VII. The amount of interest to be recovered from a particular bill shall be calculated **@ 1.2% loading on State Bank of India MCLR (3 years) (applicable on the date of Down payment) per annum** on the value of Down payment corresponding to the %age of total progressive payment being released. The period for which the interest is to be calculated shall be reckoned from the date of release of the Down payment to the actual date of release of the said progressive payment or the expiry of the stipulated time frame for release of such progressive payments under the contract, whichever is earlier. The interest on the Down payment shall stand fully recovered on release of all the progressive payments. If the amount payable under any interim bill is not sufficient to cover all deductions to be made for interest on the Down payment and other sums deductible therefrom, the balance outstanding shall be recovered from the next payments immediately falling due.

Note: In case the contractor decides not to take interest bearing Down payment, the Down payment shall be proportionately adjusted in the Progressive payment of 80%.

(II) **Eighty percent (80%)** of the total Civil Works Price Component of Contract Price shall be paid progressively on certification by the Project Manager for the quantum of work completed and by Project Manager's field quality surveillance representative for the successful completion of quality check points involved in the quantum of work billed.

Note : The release of first progressive payment for civil works shall also be subject to submission of documentary evidence by the Contractor towards having taken the insurance policy(ies) in terms of relevant provisions of GCC Clause 34 (Insurance) and acceptance of same by the Project Manager.

(III) -Deleted-

(IV) -Deleted-

(V) (a) **Five Percent (5%)** of total Civil Works Price Component of Contract Price on **Successful Completion of Trial/Initial Operation including all associated auxiliaries and ancillary works for Unit-I and completion of common facilities** and issue of Completion Certificate by the Project Manager for Unit-I and common facilities and successful completion of applicable Performance Guarantee Tests and issuance of Operational Acceptance Certificate by the Project Manager.

V) (b) **Five Percent (5%)** of total Civil Works Price Component of Contract Price on **Successful Completion of Trial/Initial Operation including all associated auxiliaries and ancillary works for Unit-II** and issue of Completion Certificate by the Project Manager for Unit-II and successful completion of applicable Performance Guarantee Tests and issuance of Operational Acceptance Certificate by the Project Manager.

(VI) Secured advance against materials (Cement & Reinforcement Steel) shall be paid to the Contractor on the certificate of Project Manager. The contractor shall be paid material secured advance upto maximum limit of 75% (exact percent of material secured advance shall be decided by Project Manager based on total requirement of Cement and Reinforcement Steel for the complete work and total cost of Civil Construction works as provided in the Contract) of the cost of Cement & Reinforcement Steel which in the opinion of Project Manager is reasonably required in accordance with the Contract and the same has been brought to site for incorporation in the works and are safeguarded against loss due to any cause whatsoever and stored as per requirement of Technical specification.

Total amount of secured advances against material (i.e., Cement & Reinforcement Steel) payable as per the above provision however, shall not exceed 10% of the cost of total Civil Construction works for cement & 25% of the cost of total Civil Construction works for Reinforcement Steel.

(VII) The material secured advance payment under clause (VI) above shall be fully adjusted from the payments due to contractor for the works done against clause (II) above as and when materials are utilised in the same.

(VIII) On completion of works as per requirement of specification, if any balance materials (i.e. Cement and Reinforcement Steel) are available in the contractor's store after full adjustment of material secured advance from the payments due under clause (II) above, contractor shall be allowed by the Employer to take out the balance material (Cement & Reinforcement Steel) from the plant.

(IX) The Contractor store shall be opened, for supervision and verification by the Project Manager or his authorised representatives, at any time, in case he so desires.

Note: In case the Civil Works Price (including Site Fabricated Structural Works Price) is more than 38 % of the cumulative total of FOB & Ex-works Price of Main Equipment, the amount by which it is higher shall be retained while releasing progressive payments due on completion of civil works (including Site Fabricated Structural works), and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid along with payment due on completion of Trial Operation / Completion of Facilities.

(If Prices are quoted in foreign currency then SBI Bills Selling exchange rate as on the date set for submission of Price bids shall be considered for the purpose of computing Civil Works percentage /retention amount).

G. **Schedule No. 4 : Site Fabricated Structural Works**

The Site Fabricated Structural Works Price Component of the Contract Price shall be paid as under:

(I)(a) **Five (5%)** of the total Site Fabricated Structural works Price component of the Contract Price will be paid to the Contractor **as interest bearing Down** payment on:

(i) Acceptance of Notification of Award and Signing of Contract Agreement.

(ii) Establishment of their office at site in preparatory to commencement of Site Fabricated Structural Works.

(iii) Submission of an unconditional Bank Guarantee for an amount equivalent to one hundred ten percent (110%) of the Down payment amount plus GST as applicable on the Down payment to be paid to the contractor, which shall be initially kept valid upto ninety (90) days beyond the schedule date for Completion of the last Facility covered under the Package. However, in case of delay in completion of the facilities covered under the package, the validity of this Down payment Bank Guarantee shall be extended by the period of such delay. The proforma of the Bank

Guarantee is enclosed in Section-VII-Bank Guarantee Form for Down Payment.

(iv) Submission by the Main Contractor of an unconditional Bank Guarantee(s) towards Performance Security(s) in respect of all Contracts (including the Contracts entered into with the Contractor's Assignee, if applicable in case of foreign contractor) and submission by the Assignee (if applicable in case of Foreign Contractor) of an unconditional Bank Guarantee(s) towards Performance Security(s) in respect of all Contracts entered into with the Assignee, all initially valid upto ninety (90) days after the end of Defects Liability Period of all equipments covered under the Contract. The proforma of Bank Guarantee is enclosed in Section-VII-Form of Performance Security.

(v) Submission of an unconditional Bank Guarantee towards Performance Security for Phased Manufacturing Program (PMP) for Steam Turbine Generator Sets, which shall be initially kept valid upto 90 days beyond the Schedule date of Completion of PMP. However in case of delay in Completion of above, the validity of this Bank Guarantee shall be extended by the period of such delay. Proforma of BG is enclosed in Section-VII-Form of Performance Security regarding Phased Manufacturing Program.

(vi) Submission of unconditional Bank Guarantee(s) from all executents of Deed(s) of Joint Undertaking other than Contractor towards faithful performance of the Deed(s) of Joint Undertaking for amount(s) and validity specified in the respective Deed(s) of Joint Undertaking enclosed in Section-VII of Bidding Documents. The proforma of Bank Guarantee(s) shall be as enclosed in Section - VII.

(vii) Submission of a detailed PERT Network based on the work schedule stipulated in Appendix-4 to Form of the Contract Agreement and its approval by the Employer.

(viii) Down Payment for Site Fabricated Structural works price components shall be released after certification of Engineer-in-Charge that the Contractor has brought to site the Safety equipments & Safety Personal Protective Equipments as per minimum quantity specified in the Bidding Documents.

In case the Contractor decides not to take Down payment, the first progressive payment for Site Fabricated Structural works price component shall be released after certification of Engineer-in-Charge that the Contractor has brought to site the Safety equipments & Safety Personal Protective Equipments as per minimum quantity specified in the Bidding Documents.

(I)(b) **Further, Five Percent (5%)** of the total Site Fabricated Structural works Price component of the Contract Price will be paid to the Contractor **as interest bearing Down** payment on:

(i) Fulfillment of conditions as mentioned at G(I)(a)(i) to (viii) above

(ii) Submission of an unconditional Bank Guarantee for an amount equivalent to one hundred ten percent (110%) of the Down payment amount plus GST as applicable on the Down payment to be paid to the contractor, which shall be initially kept valid upto ninety (90) days beyond the schedule date for Completion of the last Facility covered under the Package. However, in case of delay in completion of the facilities covered under the package, the validity of this Down payment Bank Guarantee shall be extended by the period of such delay. The proforma of the Bank Guarantee is enclosed in Section-VII-Bank Guarantee Form for Down Payment.

(iii) Finalisation of Structural Works Agency and submission of copy of purchase order/contract placed by Contractor and duly accepted by Structural Works Agency and T&P & manpower mobilization as identified alongwith PERT Network for start of Site Fabricated Structural works and certification thereof by the Engineer-in-Charge.

(I)(c) The recovery of the interest component on the above Down payment amount shall be made from the progressive payments released to the contractor as per clause G(II) to G(V) of Appendix-1, Form of Contract Agreement, Book 3 of 3, Section-VII. The amount of interest to be recovered from a particular bill shall be calculated **@ 1.2% loading on State Bank of India MCLR (3 years) (applicable on the date of Down payment) per annum**. The period for which the interest is to be calculated shall be reckoned from the date of release of the Down payment to the actual date of release of the said progressive payment or the expiry of the stipulated time frame for release of such progressive payments under the contract, whichever is earlier. The interest on the Down payment shall stand fully recovered on release of all the progressive payments. If the amount payable under any interim bill is not sufficient to cover all deductions to be made for interest on the Down payment and other sums deductible therefrom, the balance outstanding shall be recovered from the next payments immediately falling due.

Note: In case the contractor decides not to take interest bearing Down payment, the Down payment shall be proportionately adjusted in the balance payments excluding final payment (i.e. in Progressive Payments at G-II to G-V).

(II) Eighty percent (80%) of the total Structural Works Price Component shall be paid progressively on (a) certification by the Project Manager for the quantum of work completed and (b) certification by the Project Manager's Field Quality Surveillance representative for the successful completion of quality check points involved in the quantum of work billed.

Note:

(i) The release of first progressive payment for Site Fabricated Structural works shall also be subject to submission of documentary evidence by the Contractor towards having taken the insurance policy(ies) in terms of relevant provisions of GCC Clause 34 (Insurance) and acceptance of same by the Project Manager.

(i) Sequence of painting of structures as given in technical specifications shall be followed.

(III) **Deleted**

(IV) **Deleted**

(V) **Deleted**

(VI) (a) **Five Percent (5%)** of total Structural Works Price Component of Contract Price on **Successful Completion of Trial/Initial Operation including all associated auxiliaries and ancillary works for Unit-I and completion of common facilities** and issue of Completion Certificate by the Project Manager for Unit-I and common facilities and successful completion of applicable Performance Guarantee Tests and issuance of Operational Acceptance Certificate by the Project Manager.

(VI) (b) **Five Percent (5%)** of total Structural Works Price Component of Contract Price on **Successful Completion of Trial/Initial Operation including all associated auxiliaries and ancillary works for Unit-II** and issue of Completion Certificate by the Project Manager for Unit-II and successful completion of applicable Performance Guarantee Tests and issuance of Operational Acceptance Certificate by the Project Manager.

H. **Payment terms for Price Adjustment Amount**

Any addition due to adjustment to the Contract Price shall be payable in the similar manner as provided in the clauses A, B, E, F and G above. The price adjustment amount corresponding to Down payment shall be clubbed with the first progressive payment of that equipment. Reduction to the Contract Price, if any, due to price adjustment provisions, shall be effected by recovering 100% of the reduction amount (including Down payment) from any of the Contractor's bills falling immediately due for payment.

I. **Schedule – 7 & 7A : Payment Terms for Taxes & Duties**

i) Indian Custom Duties or levies including Stamp Duty and Import License Fee levied by the Government of India or any State Government in India on the Plant and Equipment including Mandatory Spares supplied from abroad (covered in Schedule-1) and on recommended spares (when ordered) supplied from abroad and covered in Schedule No.6, which are to be imported into India and which will become the property of the

Employer, shall be paid directly by the Contractor to the Government of India or the concerned authorities and the same shall be reimbursed to the Contractor on production of satisfactory evidence of having paid the custom duty amount to the concerned authorities.

ii) Notwithstanding the above, if the Contractor chooses to ship the equipment in Shipper's Containers, then the custom duty levied on such empty Containers shall not be borne by the Employer and shall be borne and payable/reimbursable by the Contractor. Further, Anti-dumping duty, Countervailing duty on subsidised articles, Safeguard duty etc. and any other tax including GST, levies, cess etc. applicable on such additional duties, if imposed on Plant and Equipment including Type Test and Mandatory Spares/ Recommended Spares, shall be borne by the Contractor.

iii) 100% of applicable Taxes and Duties (other than the custom duty payable as in para (i) above) which are payable by the Employer under the Contract shall be paid/reimbursed to the Contractor or Assignee of foreign Contractor (if applicable) upon receipt of equipment/ spares/ services and on production of satisfactory documentary evidence by the Contractor/Assignee, as applicable. However, GST as applicable on Down payment shall be paid to the Contractor along with the Down payment sanctioned. The GST paid along with Down payment shall be adjusted prorata against the tax due upon supply of goods/services, based on the value of the respective goods/services.

J. **Schedule - 8A / 8B (as applicable) :** 100% of each Type Test Charges shall be paid to the Contractor upon conductance of the corresponding Type Test and Certification by the Engineer thereon.

K. **Schedule-4 : Payment Terms for Annual Maintenance Contract (AMC) :** The Payment for comprehensive AMC shall be made on monthly prorata basis on certification by Employer's site representative regarding successful maintenance of the system by the Contractor.

L. Additional Advance Payment

An Additional Advance upto 5% of the Ex works/Installation Services (including Civil Works) price component, apart from the Advance already provided for in the specified Terms of Payment, may be paid to the Contractor which shall be interest bearing and against Bank Guarantee of 110% of the advance requested and covering the interest charges. The advance amount shall be provided during various phases of Contract execution to meet the requirement of payment by the Contractor to the contractor’s sub-vendors/sub-contractors but in aggregate shall not exceed 5% of the Ex works/Installation Service (including Civil Works) Price Component. The advance amount shall be released in Indian Rupees only and Tax implication, if any, shall be to the account of the Contractor.

While applying for advance under this provision, the contractor shall provide a statement of past payment utilization evidencing the need for cash flow support and also plan for utilization of the amount requested as per above. The advance shall be provided in exceptional circumstances to enable work to be carried out. The advance amount shall be transferred to an ESCROW account (to be opened by the Contractor in any Scheduled Bank of India under intimation to the Employer) and after availing the advance, the contractor will be required to submit proof of utilization, as per the recovery plan submitted to Employer. Sample format enclosed at Annexure-3 to Appendix-1.

The advance amounts shall be interest bearing and rate of interest to be notified by the Employer from time to time. This advance shall not be lumpsum advance, but shall be provided in phases to tide over the financial constraints being faced by the contractor, along with the progress of work. The requirement of this advance shall be with the approval of the Employer's Project Manager.

The recovery of the interest component on the advance amount shall be made from subsequent progressive payments to be released to the contractor.

The period for which the interest to be calculated, shall be reckoned from the date of release of the Additional Advance(s) to the actual date of release of subsequent progressive payments as per the Plan to be agreed with the Contractor.

The advance Amount shall be recovered from the milestone payments to be agreed between Employer and the Contractor.

PAYMENT PROCEDURES

The Procedures to be followed in making application for, certifying and making payments shall as follows :

1. **Payment Schedule/Price Break-Up for Payments**

1.1 The Contractor shall prepare and submit to the Employer for approval, a break-up of the Contract Price in the currencies of the Contract. It is expected that the Contractor shall indicate the price of a single item in one currency only. However, if the Contractor intends to receive payment for some items in more than one currency, the Contractor would be required to furnish a separate breakup and the payment for such items shall be made based on the agreed rates. The Contract Price break-up shall be interlinked with the agreed detailed PERT Network of the Contract setting forth starting and completion dates for the various key phases of the Facilities. Any payment under the Contract, subsequent to Down payment, shall be made only after the Contractor's price break-up is approved by the Employer. The aggregate sum of the Contractor's price break-up shall be equal to the Total Contract Price.

1.2 The Billing Breakup for Mandatory Spares shall be submitted to the Employer for approval as per the format enclosed as Annexure-1 to this APPENDIX-1 indicating therein the details such as Make, Model number, Drawing/Datasheet number and part number of all spare items. The relevant drawings/documents shall be submitted along with the Billing Break up.

1.3 The Contractor shall, by the 15th April of every year, furnish the BBU value of supplies sourced from Micro and Small Enterprises (MSEs) alongwith the total BBU value of supplies dispatched by it during the preceding financial year as per the format enclosed as Annexure-2 to this APPENDIX-1.

2. **Currency of Payment**

2.1 The Contract Price shall be paid in the currency or currencies in which the various price components have been stated and as incorporated in the Contract.

3. **Application for Payment**

3.1 The Contractor shall submit application for the payment in the proforma enclosed. The Contractor shall submit to the Project Manager separate applications for payment in different currencies whenever payment is to be made in more than one currency.

3.2 Each such application shall state the amount claimed and shall set forth in details, the order of the Payment Schedule, particulars of the Facilities including the Facilities executed at Site and of the equipments shipped/brought on to the Site pursuant to the Contract upto the date mentioned in the application and for the period covered since the last preceding certificate, if any.

3.3 Every interim payment certificate shall certify the Contract Value of the Facilities executed upto the date mentioned in the application for the payment certificate,

provided that no sum shall be included in any interim payment certificate in respect of the Facilities that according to the decision of the Project Manager, does not comply with the Contract, or has been performed, at the date of certificate prematurely.

3.4 In case the Contractor is a non resident/foreign company, the release of first progressive payment shall also be subject to submission of Certificate from Indian Tax Authority or Ruling determining the applicable rate of Income Tax in terms of relevant provisions of GCC clause on Taxes & Duties and acceptance of same by the Engineer-in-Charge.

4. **Due Dates for Payment**

4.1 The Down payment amount shall be payable after fulfilment of all the conditions laid down in the Terms of Payment (Appendix 1 to the Contract Agreement) and receipt of the Contractor's invoice alongwith all necessary supporting documents for such Down payment. Employer will make progressive payment as and when the payment is due as per the Terms of Payment set forth in Appendix 1 to the Contract Agreement . Progressive payment other than that under the Letter of Credit will become due and payable by the Project Manager within fifteen(15) days from the date of receipt of Contractor's bill/invoice/debit note by the Employer, provided the documents submitted are complete in all respects.

Contractor shall be required to raise its consolidated invoices/bills only once a month except for LC payments.

5. **Mode of Payment**

5.1 The Employer will establish an irrevocable Letter of Credit (L/C) in favour of the Contractor through the Employer's Bank in Employer's country for payments due, as per Terms of Payment, on despatch of equipments including Mandatory Spares i.e. CIF despatch of equipments including Mandatory Spares (including due payments towards Ocean Freight and Marine Insurance). The value of L/C will be as per payment schedule for each quarter and valid for a quarter. It will be the responsibility of the Contractor to utilise the L/C to the fullest extent. In case L/C has been established by the Employer and not utilised by the Contractor, for reasons of delay attributable to him, all reinstatement charges for the L/C for further period necessitated due to non-utilisation of L/C will be to the account of the Contractor.

5.2 The payment of the Down Payment amount, Type Test Charges if any, price adjustment amounts, all other supply payments, taxes and duties (wherever admissible) inland transportation (including port handling if any) insurance and the Installation Portion of the Facilities including Civil, Structural and Allied Works (if any), shall be made direct to the Contractor by the Employer and no L/C shall be established by the Employer for such payments. Wherever technically feasible, such payments shall be made electronically only as per details of Bank Account indicated in the contract. In case of any changes to the bank account indicated in the contract, the contractor shall immediately inform the employer. The Contractor shall hold the employer harmless and employer shall not be liable for any direct, indirect or consequential loss or damage sustained by the bidder

on account of any error in the information or change in Bank details provided to the employer in the prescribed form without information to employer duly acknowledged.

5.3 **For Payments related to Erection / Civil / Site Fabricated Structural Works**

A single designated ESCROW account shall be opened by the Contractor in any Scheduled Bank of India under intimation to Employer. All payments related to Erection / Civil / Site Fabricated Structural works by the Employer due under the contract to the Contractor shall be released into above-mentioned ESCROW account set up as per the Tri-Partite Escrow Agreement between Employer, Contractor and Escrow Bank. The payment shall be disbursed in accordance with the mechanism set out in the Contract and Escrow Agreement. The purpose of the Escrow Account would be to ensure that payments received under the contract are solely used for implementation of the Contract. Under Tri-partite Escrow Agreement, the Escrow Bank will agree to ensure that amounts received in the ESCROW Account are utilized for making payments only to suppliers of goods and services, statutory authorities, establishment expenses etc. as may be required in the performance of the contract.

All expenses/charges for opening /operation (including Annual Fee) of the Escrow Account shall be paid by the Contractor.

The draft agreement is annexed as Annexure-3 to this Appendix-1, which shall be followed for executing Escrow Account Agreement.

The Detailed Operative Procedure and Terms and Conditions of Escrow Account (Schedule III of draft agreement) shall be finalized between the Employer, Contractor and the Escrow Bank within 15 days of the placement of award.

FORM OF APPLICATION FOR PAYMENTS

Project	:		
Equipment Package	:	Date	:
Name of Contractor	:	Contract No.	:
Contract Value	:	Contact Name	:
Unit Reference	:	Application Serial Number	:

To

..... *
(Name of Employer)

Dear sir

APPLICATION FOR PAYMENT

1. Pursuant to the above referred Contract Agreement dated ..... the undersigned hereby applies for payment of the sum of ..... (Specify amount and currency in which claim is made).

2. The above amount is on account of : (check whichever applicable)

   Down Payment (Schedule **)

   Interim Payment as Advance (Schedule **)

   Progressive Payment against despatch of equipment (Schedule **)

   Progressive Payment against receipt of equipment (Schedule **)

   Progressive Payment against Installation (Schedule **)

   Ocean Freight & Marine Insurance (Schedule **)

   Inland Transportation (Schedule **)

   Inland Insurance

   Price Adjustment

   Extra Work not specified in Contract
   (Ref. Contract Change Order No.....)

Others (specify)

Final Payment (Schedule **)

as detailed in the attached schedule(s) which form an integral part of this application.

3. The payment claimed is as per item(s) No (s) ..... of the payment schedule annexed to the above mentioned Contract.

4. The application consists of this page, a summary of claim statement (Schedule **), and the following signed schedules

1 ----------

2 ----------

3 ----------

The following documents are also enclosed :

1 ----------

2 ----------

3 ----------

Signature of Contractor/
authorised Signatory

* Application for payment will be made to 'Project Manager' as to be designated for this purpose at the time of Notification of Award.

\# Prepare separate application for claims in different currencies.

** Proforma for the Schedules will be mutually discussed and agreed to during the finalisation of the Contract Agreement.

Annexure-1 to Appendix-1(Rev.01)

PROJECT : **CLIENT :** **.**

PACKAGE:

TITLE : **BILLING BREAK UP FOR MANDATORY SPARES** **CONTRACTOR :** **..**

NOA REF : **CS**

BILLING BREAKUP (BBU) NO. :

Sl.No.	Description	Quantity	Unit	Unit Price	Total Price	Equipment Make	Equipment Model	Drawing / Documents/Data Sht no.	Part No.	Remarks

Annexure-2 to APPENDIX-1(Rev.01)

Proforma for details to be furnished by the Contractor by 15th April of every financial year of supplies sourced from MSEs dispatched during the preceding financial year.

Package Name:
Project Name:
Name of the Contractor:
COA No.:

Details of BBU value of supplies dispatched during the preceding financial year …… are furnished here below:

BBU value of total supplies dispatched **(A)** (in eqvt INR)	Out of the total supplies dispatched, BBU value of supplies sourced from MSEs **(B)** (in eqvt INR)	Percentage of supplies sourced from MSEs wrt total supplies dispatched **(C B 100/A)** (%)
……..	……	…….

In case of no supplies sourced from MSEs, mention 'NIL'.

I, on behalf of M/s ……. (*Contractor*) hereby declare that the information furnished above is correct.

Signature……
Name……..
Designation and Seal…….

Annexure-3 to APPENDIX-1(Rev.01)

(To be executed on Non- Judicial Stamp Paper of Appropriate Value)

ESCROW AGREEMENT

ESCROW AGREEMENT (hereinafter referred to as this "**Agreement**") is entered into on this the __ day of _____ 20__ at _____.

BETWEEN:

M/S _____ a Company incorporated under the laws of _____ and having its principal place of business at _____ (hereinafter referred to as the "**Employer**", which expression shall, unless it is repugnant to the subject or context thereof, include its successors and assigns) of the **FIRST PART**;

AND

M/S _____ a Company incorporated under the laws of _____ and having its principal place of business at _____ (hereinafter referred to as the **"Contractor"**, which expression shall, unless it is repugnant to the subject or context thereof, include its successors, transferees and permitted assigns) of the **SECOND PART**;

AND

M/S _____, a body corporate incorporated under the laws of India and a banking company within the meaning of Section 5 (c) of the Banking Regulation Act, 1949 (10 of 1949) and having its registered office at _____ in its capacity as the Escrow Agent for the Contractor (hereinafter referred to as the

"**Escrow Bank**", which expression shall, unless it be repugnant to the subject or context thereof, include its successors and permitted assigns) of the **THIRD PART**.

The Employer, the Contractor and the Escrow Bank are individually referred to as "**Party**" and collectively as "**Parties**".

WHEREAS:

A. The Employer vide IFB No._____ dated _____ ("**Tender**") had invited bids for _____("**Package**") for _____ _____("**Project**").

B. Accordingly, the said "Contractor", submitted its bid in response to the above mentioned NIT.

C. Pursuant to the IFB and the bid submitted by the Successful Bidder / Contractor, the Employer issued the Notification of Award dated - _____bearing no._____ ("**Notification of Award**") and executed Contract Agreement Reference No. _____dated _____ (hereinfter called Contract).

D. In terms of Clause_____ of the Contract/ General Conditions of Contract/ Special Conditions of Contract, the Contractor is required to open and maintain separately an Escrow Account with the Escrow Bank.

E. The Contractor have approached _____Bank to act as an escrow agent and the_____ Bank has agreed to act as the Escrow Bank under this Escrow Agreement; and

F. Accordingly Parties are desirous of executing this Escrow Agreement to set out the manner and procedure for operation of the escrow account and other matters in connection therewith.

G. All payments related to Erection/Civil/Site Fabricated Structural works due

under the Contract will be released by the Employer to the Contractor in the Escrow Account. The Contractor is required to make payment to suppliers of goods and services, statutory authorities, establishment expenses etc as may be required in the successful performance of the Contract.

H. The Contractor is required to utilise the money collected in the Escrow Account in accordance with the waterfall mechanism set out in this Agreement.

I. In view of the aforesaid, the mutual covenants, and understandings setforth herein, the Parties wish to enter into this Agreement for setting out the terms and conditions to deal with all payments in accordance with the requirements set out in the Bid Document.

NOW, THEREFORE, in consideration of the premises herein set forth and other good and valid consideration, the receipt and adequacy of which are hereby expressly acknowledged, the Parties with the intent to be legally bound hereby agree as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 DEFINTIONS

In this Agreement the following words and expressions shall, unless repugnant to the context or meaning thereof, have the meaning hereafter respectively assigned to them.

Applicable Law means all applicable statutes, laws, by – laws, rules, regulations, orders, ordinances, protocols, codes, guidelines, policies, notices, directions, judgments, decrees or other requirements or official directive of any governmental authority or court or other law, rule or regulation, approval from the relevant governmental

authority, government resolution, directive, or other government restriction or any similar form of decision of, or determination by, or any interpretation or adjudication having the force of law in India.

Business Day means a day other than a Sunday or a bank holiday on which banks are normally open for business during banking business hours in Delhi, India.

Contractor shall have the meaning as ascribed to it in Second Part

Employer shall have the meaning as ascribed to it in First Part.

Escrow Account shall mean the account in the name and style of "_____" opened and maintained by the Contractor in terms of Section-V, Clause as Special Conditions of Contract No. 60 (General Condition of Contract Clause No. 12) with the Escrow Bank and operated in terms of this Escrow Agreement.

Escrow Agreement shall mean this agreement, together with the schedules hereto, as may be amended, modified or supplemented from time to time, in accordance with its terms.

Escrow Bank shall have the meaning as ascribed to it in Third Part.

Notification of Award shall have the meaning as ascribed to it in Recital C.

Package shall have the meaning as ascribed to it in Recital A.

Project shall have the meaning as ascribed to it in Recital A.

Tender shall have the meaning as ascribed to it in Recital A.

1.2 PRINCIPLE OF CONSTRUCTIONS

Employer	Contractor	Escrow Bank

In this Agreement, unless the context otherwise requires:

(a) reference to an Account includes a reference to any sub – account of that Account;

(b) reference to an "amendment" includes a supplement, modification, novation, replacement or re-enactment and "amended" is to be construed accordingly;

(c) a reference to "authorization" includes an authorization, consent, clearance, approval, permission, resolution, license, exemption, filing and registration;

(d) a reference to "control" includes the power to direct by contract or otherwise;

(e) unless the context otherwise requires, the singular includes the plural and vice versa;

(f) a reference to a Schedule is, unless indicated to the contrary, a reference to a schedule to this Agreement;

(g) the words "other", "or otherwise" and "whatsoever" shall not be construed *ejusdem generis* or be construed as any limitation upon the generality of any preceding words or matters specifically referred to;

(h) references to the word "includes" or "including" are to be construed without limitation;

(n) all references to agreements, documents or other instruments include (subject to all relevant approvals) a reference to that agreement, document or instrument as amended, supplemented, substituted, novated or assigned from time to time;

(o) any reference to a public organization shall be deemed to include

any successor to such public organization or any organization or functions or responsibilities of such public organization;

(p) "year" "month" and "day" wherever used in this Agreement imply that of English calendar;

(q) words and abbreviations, which have, well known technical or trade / commercial meanings are used in the Agreement in accordance with such meanings;

(r) A reference to times and dates in this Escrow Agreement are references to times and dates in India.

(s) Any date or period as set out in any clause of this Escrow Agreement may be extended with the written consent of the Parties.

(t) The Schedules form an integral and operative part of this Escrow Agreement and references to this Escrow Agreement shall include references to the Schedules.

2. APPOINTMENT OF ESCROW BANK

Each of the parties acknowledges that the Escrow Bank has been appointed under this Escrow Agreement and that it shall discharge its functions in accordance with the terms of this Escrow Agreement. Escrow Bank hereby accepts the escrow arrangement hereby declared and provided upon the terms and conditions set forth in this Escrow Agreement.

3. ESTABLISHMENT OF THE ACCOUNTS

The Contractor has established with the Escrow Bank an account with its branch, the details of which are provided in **Schedule – II** hereto, titled the "_____Account". The Contractor acknowledges and agrees that it shall maintain the Escrow Account.

4. OPERATING PROCEDURES

The Employer, the Contractor and Escrow Bank, have prior to execution of this Agreement agreed on the detailed terms and conditions and Operating Procedures for the Escrow Account (as set out in **Schedule – III**), provided however, in the event of any inconsistency between this Agreement and such mandates, terms and conditions or procedures, this Agreement shall prevail.

Based on the request from the Contractor, the Employer will approve the list of suppliers of goods and services, statutory authorities, establishment expenses etc. to whom payments could be made and the same shall be shared with the Escrow Bank from time to time.

All transfers and payments pursuant to this Agreement shall be in a manner consistent with the operating procedures.

The Escrow Bank shall submit to the Employer the usage of monies withdrawn from the Escrow Account together with a monthly statement from the Escrow Bank evidencing receipt and withdrawal of funds into and from the Escrow Account.

The Employer shall be entitled to verify the usage of funds withdrawn from the Escrow Account.

At any time the Employer is entitled to seek an account statement from the Escrow Bank and such evidence of usage of funds by the Contractor from the Escrow Account as required by the Employer.

5. OBLIGATIONS OF THE CONTRACTOR

Nothing contained in this Agreement shall affect the obligations of the Contractor under the Bid Documents or Contract Agreement as set out above.

The Contractor shall simultaneously deliver a copy to the Employer of any notice or document delivered to the Escrow Bank pursuant to this

Agreement.

6. ESCROW BANK SERVICE CHARGES AND EXPENSES

The Contractor shall pay, on demand, all the usual and customary service charges, transfer fees, account maintenance, account acceptance, statement, investigation, funds transfer and any other charges as are levied by the Escrow Bank as mutually agreed and such other out of pocket expenses as are claimed by the Escrow Bank (collectively, the "**charges**") in connection with the Escrow Account. In addition the Contractor has agreed to pay one-time bank escrow service charges of Rs._____ plus applicable service tax. Contractor shall deposit the one- time bank escrow service charges in to the Escrow Account within three Business Days of the opening of the Escrow Account and/ or shall deposit the charges from time to time of such demand by the Escrow Bank. In the event Contractor fails to make the timely payment to the Escrow Bank of the one-time bank escrow service charges and/or the charges, the Escrow Bank shall have the right to withdraw such amounts from the Escrow Account as is necessary for the payment of the one-time bank escrow service charges and charges, in which case Contractor shall replenish the Escrow Account with such amounts equivalent to the amounts withdrawn by the Escrow Bank within ____ Business Days of such withdrawal.

7. ESCROW BANKS'S DUTIES AND LIABILITIES

7.1 The Escrow Bank shall have only those duties, obligations and responsibilities expressly specified in this Escrow Agreement and shall have no duties, obligations or responsibilities which are implied or inferred by law or otherwise.

7.2 The duties of the Escrow Bank under this Escrow Agreement are purely ministerial, administrative and non-discretionary in nature. Neither Escrow Bank nor any of its directors, officers, agents and employees shall, by reason of anything contained in this Escrow Agreement, be deemed to be a trustee for or have any fiduciary relationship with the parties. Where the Escrow Bank has acted in accordance with this Escrow Agreement, it shall be deemed to have acted as if instructed to do so by the Employer

7.3 The Escrow Bank shall not be required to expend or risk any of its own funds or otherwise incur any liability, financial or otherwise, in the performance of any of its duties under this Escrow Agreement.

7.4 The Escrow Bank shall not be precluded by virtue of this Escrow Agreement (and neither shall any of its directors, officers, agents and employees or any company or persons in any other way associated with it be precluded) from entering into or being otherwise interested in any banking, commercial, financial or business contacts or in any other transactions or arrangements with the parties or any of their affiliates provided such transactions or arrangements are not contrary to the provisions of this Escrow Agreement.

7.5 The Escrow Bank shall not be bound or affected, in its capacity as Escrow Bank, in any way by the Agreement or any agreement or contract between Parties to which the Escrow Agent is not a party. The Escrow Bank, in its capacity as an escrow bank, is deemed not to have any knowledge of any provision of the Agreement or any other document unless the substance of such provisions is explicitly set forth in this Escrow Agreement. The Escrow Bank shall not in any way be required to determine whether or not the terms and conditions of the Agreement or any other agreement or contract between the Parties to which the Escrow Bank is not a party have been complied with. Furthermore, the Escrow Bank is deemed not to have any knowledge or notice of any fact or circumstance not specifically set forth in this Escrow Agreement.

7.6 The Escrow Bank may, in good faith, accept and rely on any notice, instruction or other document received by it under this Escrow Agreement as conclusive evidence of the facts and of the validity of the instructions stated in it and as having been duly authorised, executed and delivered and need not make any further enquiry in relation to it. The Escrow Bank may act in conclusive reliance upon any instrument or signature believed by it, acting reasonably, to be genuine and may assume, acting reasonably, that any person purporting to give receipt, instruction or advice, make any statement, or execute any document in connection with the provisions of this Escrow Agreement has been duly authorised to do so. The Escrow Bank shall be under no duty to inquire into or investigate the validity, accuracy or content of any such document.

7.7 The Escrow Bank shall not be liable to any person for any losses arising out of or in connection with the performance or non-performance of its obligations under this Escrow Agreement, except to the extent directly resulting from the wilful default or gross negligence of the Escrow Bank.

7.8 The Escrow Bank may execute any of its powers and perform any of its duties under this Escrow Agreement directly or through appointed agents or attorneys.

7.9 'Force Majeure Event' means any event (including but not limited to an act of God, fire, epidemics, natural calamities; riots, civil commotion or unrest, terrorism, war, strikes or lockouts; expropriation or other governmental actions; any changes in applicable law or regulation including changes in market rules, currency restrictions, devaluations or fluctuations; market conditions affecting the execution or settlement of transactions or the value of assets; and breakdown, failure or malfunction of any telecommunication and information technology systems beyond the control of any Party which restricts or prohibits the performance of the obligations of such Party contemplated by this Agreement.

The Escrow Bank shall not be held liable for any loss or damage or failure to perform its obligations hereunder, or for any delay in complying with any duty or obligation, under or pursuant to this Agreement arising as a direct or indirect result of any Force Majeure Event.

7.10 The Escrow Bank may at its cost, consult with, and obtain advice from its lawyers or professional advisers over any question in relation to, and its duties under this Escrow Agreement. The Escrow Bank shall not incur any liability for taking any action or omitting any action in accordance with such advice.

7.11 The Escrow Bank does not have any proprietary or other interest in the Escrow Account, but is to serve as escrow holder only and having only possession thereof.

7.12 The Escrow Bank shall not be liable or responsible for obtaining any regulatory or governmental or other approval in connection with or in relation

to the transactions contemplated herein and shall not be in any manner obliged to inquire or consider whether any regulatory or governmental approvals have been obtained.

7.13 The Escrow Bank shall not be obliged to supervise, control or perform any acts or responsibilities of the First Party or the Second Party or any other third party.

7.14 Any act to be done by the Escrow Bank shall be done only on a Business Day, during banking business hours, at _____, India and in the event that any day on which the Escrow Bank is required to do an act, under the terms of this Escrow Agreement, is a day on which banking business is not, or cannot for any reason be conducted, then the Escrow Bank shall do those acts on the next succeeding Business Day.

7.15 The Escrow Bank is under no duty to ensure that funds withdrawn from the Escrow Account are actually applied for the purpose for which they were withdrawn; neither the Escrow Bank nor any of its officers, employees or agents shall be required to make any distribution to the extent that the Escrow Amount is insufficient and shall incur no liability whatsoever from any non-distribution in such circumstances.

7.16 The Parties agree that the Escrow Bank shall not be, in any way, responsible or liable to the other Parties or any third person whosoever, for deduction or withholding of any taxes in relation to the transaction for which the Escrow Account has been established pursuant hereto and the contractor acknowledge and confirm that they shall be solely and absolutely liable for any and all deductions or withholdings and payments of taxes, levies, cesses and all other statutory dues in relation thereto. The Contractors confirm that they shall be, jointly and severally, liable for payment of all stamp duties payable in relation to this Agreement as well as any other instruments executed pursuant hereto and the Escrow Bank shall not be responsible or liable for the same, under any circumstances.

7.17 The Parties agree that Escrow Bank is acting in its capacity as an escrow agent only and shall not be deemed to act as an investment, legal or tax adviser to the Parties in the performance of its obligations under the Escrow Agreement.

7.18 Notwithstanding what is stated herein, in no event shall the Escrow Bank be liable for incidental, indirect, special, punitive or consequential damages caused to the Parties.

8. NOTICE OF BREACH

The Escrow Bank to the best of its knowledge undertakes to the Employer that it shall notify the Employer of any breach by the Contractor of any of the provisions of this Agreement.

9. INDEMNITY

The Contractor shall indemnify and keep indemnified the Parties for any and all liabilities, obligations, losses, damages, penalties, actions, judgments, suits, costs, expenses, claims or disbursements of any kind or nature whatsoever which may be imposed upon, incurred by or asserted against the Parties in any way in connection with or arising out of the negotiation, preservation or enforcement of any rights under, or in carrying out its duties under this Agreement, other than those arising as a result of the Escrow Bank's gross negligence or willful default.

The Contractor shall indemnify and keep indemnified the Escrow Bank for any and all liabilities, obligations, losses, damages,

(a) acting upon any request sent by facsimile, if such facsimile was found to be sent in an unauthorized manner; or

(b) not acting upon any request if such facsimile was sent but not received by the concerned person of the Account Bank.

The obligations of the Contractor under this Agreement to indemnify and

keep indemnified the parties shall survive the satisfaction, discharge or other termination of this Agreement and the resignation or removal of the Escrow Bank under this Agreement.

10. CONFIDENTIALITY

No Party may except as permitted by this Escrow Agreement, make public or disclose to any person any information about this Escrow Agreement.

The Obligations under this clause shall survive the termination or expiry of this agreement.

11. ASSIGNMENT

Save as provided in Clause __ of the General Conditions of the Contract of the Employer, the Contractor shall not assign or transfer any part of their respective rights or obligations under this Agreement without the prior consent of the Employer, provided that this shall not prevent Employer from assigning or transferring its rights under this Agreement.

Nothing in this Agreement shall give to any other Person (other than the Parties hereto and their successors and permitted assigns) any benefit or any legal or equitable right or remedy under this Agreement.

This Agreement shall be binding on and shall inure to the benefit of the Parties hereto and the respective successors and permitted assigns.

12. NOTICES

All notices or other communications to be given under this agreement shall be made in writing to:

For the Employer:

(Name of the Employer)____

Attention (Designation of Employee)_____

Employer	Contractor	Escrow Bank

Address _____

--.
Fax No. _____
Tel No. _____

For the Contractor:

(Name of the Contractor)____

Attention (Designation of Employee)_____
Address _____

--.
Fax No. _____
Tel No. _____

For the Escrow Bank:

(Name of the Escrow Bank)

Attention (Designation of Employee)_____
Address _____

--.
Fax No. _____
Tel No. _____

Change of Address

Any Party may by notice change the addresses and / or addresses to

which such notices and communications are to be delivered or mailed. Such change shall be effective when all the Parties have written notice of it.

14. WAIVER

No failure or delay on the part of the Employer in exercising any right, power or privilege hereunder or under Contract shall impair any such right, power or privilege or operate as a waiver the Employer would otherwise have. No notice to or demand on the Contractor in any case shall entitle the Contractor to any other or further notice or demand in similar or other circumstances or constitute a waiver of the rights of the Employer to any other or further action in any circumstances without notice or demand.

15. SEVERABILITY

If any provision of this Agreement is held invalid, unenforceable or illegal, the offending provision shall be severed from this Agreement and the remaining parts of this Agreement shall remain in full force and effect.

16. AMENDMENTS

No amendment to this Agreement shall be binding unless in writing and signed by the Parties.

17. GOVERNING LAW

This Agreement shall be governed by and construed in accordance with Indian laws.

18. DISPUTE RESOLUTION

In the event of any difference or dispute arising out of the interpretation or application of the provisions of this Agreement, the Parties shall immediately consult each other with the view to expeditiously resolve such differences or disputes in a spirit of mutual understanding and co-operation. In case a

dispute is not resolved amicably between the parties within a period of 30 days;

In case any of the party is not a Public Sector Enterprise or a Govt. Department:

The same shall be referred to arbitration of a Sole Arbitrator to be appointed by the Board of the Employer. The Arbitration proceedings shall be conducted in accordance with Arbitration and Conciliation Act, 1996 and any amendment thereto. The Courts at Delhi, to the exclusion of all other courts in India, shall have exclusive jurisdiction to try any matter arising out of or connected with the said arbitration proceedings. The arbitration shall be in English and the venue of the arbitration proceedings shall be at New Delhi. Arbitration may commence prior to or after completion of the Contract.

In case the Parties are Public Sector Enterprise or a Government Department:

In case the parties are a Public Sector Enterprise or a Government Department, the dispute shall be referred for resolution in Permanent Machinery for Arbitration (PMA) of the Department of Public Enterprise, Government of India. Such dispute or difference shall be referred by either party for Arbitration to the sole Arbitrator in the Department of Public Enterprise to be nominated by the Secretary to the Government of India in-charge of the Department of Public Enterprises. The award of the Arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make a further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law & Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary / Additional Secretary, when so authorized by the Law Secretary, whose decision shall bind the Parties finally and conclusively. The Parties to the dispute will share equally the cost of arbitration as intimated by the

Arbitrator.

19. JURISDICTION

The parties irrevocably submit to exclusive jurisdiction of the Courts of Delhi in all matters arising under this Agreement.

20. REGULATORY APPROVALS

The Contractor shall procure and shall thereafter maintain and comply with all regulatory approvals required for the establishment and operation of the Accounts and the making of any deposits, transfers or withdrawals and for the performance of its obligations under this Agreement.

21. NOTIFICATION OF BALANCES

Within ____ days following the end of each calendar month, the Escrow Bank shall notify the Employer of the balance in the Account and furnish a statement of the deposits into and payment out of the Accounts at the close of business of such calendar month.

22. COUNTERPARTS, ANNEXURES, SCHEDULES

This Agreement may be executed in several counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same agreement.

23. MISCELLENOUS

The Escrow Bank shall be responsible for maintaining a correct and complete record of all transactions, deposits, withdrawals or transfer of funds relating to the Accounts.

The Escrow Bank shall not make any transfer or withdrawal from the Escrow Account except as provided for in this Agreement.

Employer	Contractor	Escrow Bank

SCHEDULE – I

1. First Part Details:

Employer	Contractor	Escrow Bank

2. Second Part Details;

3. Third Part Details;

SCHEDULE – II

DETAILS OF ESCROW ACCOUNT

Employer	Contractor	Escrow Bank

Particulars and Address of the Branch Office of the Escrow Bank for the Escrow Account	
IFSC Code	
Account Name and Account Number of Escrow Account	

SCHEDULE – III

TERMS & CONDITIONS AND OPERATING PROCEDURES

Employer	Contractor	Escrow Bank

Deposits into Escrow Account

- All the Payments related to Erection/Civil/Site Fabricated Structural works due under the Contract will be released by the Employer to the Contractor in this Escrow Account as per Terms of Payment agreed in the Contract.

Release/ Withdrawal of Funds from the Escrow Account

- Based on the request from the Contractor, the Employer will approve the list of suppliers of goods and services, statutory authorities, establishment expenses etc. to whom payments could be made and the same shall be shared with the Escrow Bank from time to time for releasing the funds.

Note: Detailed Operating Procedure in this schedule, shall be finalised between Employer, Contractor & Escrow Bank at the time of signing of this Agreement.

IN WITNESS WHEREOF the Contractor has caused its Common Seal to be affixed hereto on the date first above written, the Employer, and the Escrow Bank have caused the same and the said counterparts to be executed by the hand of an authorized official.

SIGNED AND DELIVERED BY …… (Name of Employer), the within named **EMPLOYER**, by the hand of _____

Employer	Contractor	Escrow Bank

authorized representative of the Employer, who has been authorized to execute this Agreement.

THE COMMON SEAL OF M/s_____

_____

___ the within named **CONTRACTOR,** has pursuant to the Resolutions of its Board of Directors passed in that behalf on_____

hereunto been affixed in the presence of MD and Company Secretary who has signed these presents in token thereof

SIGNED AND DELIVERED BY _____,

the within named **ESCROW BANK**, by the hand of

……..…….

Its Authorised Representative.

Employer	Contractor	Escrow Bank

AMENDMENT NO. 14 TO BIDDING DOCUMENTS (TECHNICAL SPECIFICATION)

SL. NO.	SPECIFICATION REFERENCE				Existing	Read as
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
1	Section-VI / Part-A	Spares	6/59	Group A8 Spares	AC jacking oil pump complete assembly for Main Turbine along with complete coupling — 1 No	AC jacking oil pump complete assembly for Main Turbine along with complete coupling and motor — 1 No
2	Section-VI / Part-A	Spares	6/59	Group A9 Spares	DC jacking oil pump assembly for Main Turbine along with complete coupling — 1 No	DC jacking oil pump assembly for Main Turbine along with complete coupling and motor. — 1 No
3	VI/B	A-3	12/92	1.07.00 (a)(5)	Provision for measuring bearing temperature as near the point of heat generation as possible and for measuring the oil temperature leaving the bearing.	Provision for measuring bearing temperature as near the point of heat generation as possible and for measuring the oil temperature leaving the bearing. Turbine protection on bearing temperature HI HI and on bearing vibration HI HI shall be also envisaged.
4	VI/A	**FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES**		Amendment -03 Sl No 10	The essential mandatory requirements for instruments, methods and precautions to be employed shall be in accordance with the requirements specified in the respective codes. All the necessary instruments ~~**(in duplicate)**~~ required for the tests shall be furnished by the contractor so as to meet the accuracies specified in the codes.	The essential mandatory requirements for instruments, methods and precautions to be employed shall be in accordance with the requirements specified in the respective codes. ~~**All the necessary instruments (in duplicate) required for the tests shall be furnished by the contractor so as to meet the accuracies specified in the codes.**~~ Any advanced…….

5	VI/C	GTR	23/89	8.04.03(g)	The Contractor shall submit adequate prints of drawing / data / document for Employer's review and approval. The drawings submitted by the Contractor/vendor shall be reviewed by NTPC and their comments shall be forwarded within three (3) weeks of receipt of drawings. Upon review of each drawing, ---------as noted. CATEGORY –IV For information and records.	The Contractor shall submit drawing / data / document for Employer's review and approval. The drawings submitted by the Contractor/vendor shall be reviewed by NTPC and their comments shall be forwarded within **two (2) weeks** of receipt of drawings. Upon review of each drawing, ---------as noted. CATEGORY –IV For information and records.
6	VI/C	GTR	24/89	8.04.03(h)	Contractor shall resubmit the drawings approved under Category II, III & IVR within three (3) weeks of receipt of comments on the drawings,----------and Employer shall review only such revised portion of documents	Contractor shall resubmit the drawings approved under Category II, III & IVR within **two (2) weeks** of receipt of comments on the drawings,----------and Employer shall review only such revised portion of documents.
7	VI/C	GTR	36/89	9.02.17	For components/equipment procured by the contractors for the purpose of the contract, ----------approved Quality Plans shall form a part of the purchase order/contract between the Contractor and sub-contractor. Within three weeks of the release of the purchase orders /contracts for such bought out items /components, a copy of the same without price details but together with the detailed purchase specifications, quality plans and delivery conditions shall be furnished to the Employer on the monthly basis by the Contractor along with a report of the Purchase Order placed so far for the contract.	For components/equipment procured by the contractors for the purpose of the contract, ---------- approved Quality Plans shall form a part of the purchase order/contract between the Contractor and sub-contractor. Within **two (2) weeks** of the release of the purchase orders /contracts for such bought out items /components, a copy of the same without price details but together with the detailed purchase specifications, quality plans and delivery conditions shall be furnished to the Employer on the monthly basis by the Contractor along with a report of the Purchase Order placed so far for the contract.

8	VI/C	GTR	39/89	9.03.01	Each QA Documentation shall have a project specific Cover Sheet bearing name & identification number of equipment and including an index of its contents with page control on each document. The QA Documentation file shall be progressively completed by the Supplier's sub- supplier to allow regular reviews by all parties during the manufacturing. The final quality document will be compiled and issued at the final assembly place of equipment before despatch. However CD-Rom may be issued not later than three weeks.	Each QA Documentation shall have a project specific Cover Sheet bearing name & identification number of equipment and including an index of its contents with page control on each document. The QA Documentation file shall be progressively completed by the Supplier's sub- supplier to allow regular reviews by all parties during the manufacturing. The final quality document will be compiled and issued at the final assembly place of equipment before despatch. However CD-Rom may be issued not later than **two (2) weeks.**
9	VI/C	GTR	40/89	9.03.06(c)	If a decision is made for despatch, whereas all outstanding actions cannot be …… document for applicable section when it is effectively completed. The submission of QA documentation package shall not be later than 3 weeks after the despatch of equipment.	If a decision is made for despatch, whereas all outstanding actions cannot ……. document for applicable section when it is effectively completed. The submission of QA documentation package shall not be later than **two(2) weeks** after the despatch of equipment.
10	VI/C	GTR	40/89	9.03.07	TRANSMISSION OF QA DOCUMENTATION On release of QA Documentation by Inspector, one set of quality document shall be forwarded to Corporate Quality Assurance Department and other set to respective Project Site of Employer. For the particular case of phased deliveries, the complete quality document to the Employer shall be issued not later than 3 weeks after the date of the last delivery of equipment	TRANSMISSION OF QA DOCUMENTATION On release of QA Documentation by Inspector, one set of quality document shall be forwarded to Corporate Quality Assurance Department and other set to respective Project Site of Employer. For the particular case of phased deliveries, the complete quality document to the Employer shall be issued not later than **two (2) weeks** after the date of the last delivery of equipment

11	VI/C	GTR	49/89	13.07.00	----------	New clause added Training on Erection methodologies for all the System, Sub-systems and Equipments associated with this package, including a visit to power plant construction site shall also be in the scope of bidder.
12	VI/C	GTR	53 **(13 Pages)**	24.00.00	----------	New clause added for Project monitoring software tool. SOFTWARE BASED PROJECT MONITORING TOOL (**Refer Annexure-A of this amendment)**
13	VI/E			Amendment - 03 Sl No-42	9915-999-POM-A-008	Revised P&ID (Tender Drawing 9915-999-POM-A-008 (Rev C))
14	VI/B	A-3	70/92	6.08.14 (e)	----------	New Clause: In case bidder offer extraction steam to BFPT arrangement as per BOX-B of tender P&ID of extraction steam to BFPT (9915-999-POM-A-008) then the pressure regulating valves in the CRH and Auxiliary steam line shall necessarily be electro hydraulically operated.
15	VI/B	A-3	70/92	6.08.14 (f)	----------	New Clause: BFPT exhaust hood spray arrangement shall be as per tender P&ID of extraction steam to BFPT (9915-999-POM-A-008, (Rev C)) (if Applicable).
16	VI/B	A-3	69 /92	6.08.14 (b)	During low unit load conditions, turbine bypass operation, shutdown operation when extraction pressure of the normal motive steam source is insufficient to operate the drive turbine, steam from alternate source, from the same unit, shall be admitted through a separate set of stop and control valves……	During low unit load conditions, turbine bypass operation, shutdown operation when extraction pressure of the normal motive steam source is insufficient to operate the drive turbine, steam from alternate source, from the same unit **i.e. CRH,** shall be admitted through a separate set of stop and control valves…….

17	VI/B	A-3	29 of 92	In note section of Heat balance diagrams	Drive turbines of BFP shall get steam from IP/LP crossover/cross around pipe or from a point as per optimised cycle of the Bidder during operation of turbine from full load to 60% EMCR load or below, if possible. At low loads, Drive turbines of BFP shall get steam from an alternate source from the same unit.	Drive turbines of BFP shall get steam from IP/LP crossover/cross around pipe or from a point as per optimised cycle of the Bidder during operation of turbine from full load to 60% EMCR load or below, if possible. At low loads, Drive turbines of BFP shall get steam from an alternate source from the same unit **i.e. CRH.**
18	VI/B	Sub-section E-74, Civil Works		6.6.0	Structural steel and Reinforcement steel supply if in the scope of the contractor shall be procured from Main Steel Producers. Currently, Main Steel producers considered as acceptable are SAIL, JSW Steel Ltd, Jindal Steel & Power, Tata steel Ltd. (for Reinforcement steel/TMT bars), RINL (for long products/Rolled sections and Reinforcement steel/TMT bars), Essar Steel India Ltd. (for Flat products/ Steel Plates), Electrosteel steel Ltd. (for Reinforcement steel/TMT bars) and Monnet Ispat and Energy Ltd. (for long products/Rolled sections and Reinforcement steel/TMT bars). Subsequently, if any new Main Steel Producer/s are proposed during execution of the contract, they may be considered for acceptance after an assessment.	Structural steel (plates and rolled sections i.e. channels, beams & angles) and Reinforcement steel supply if in the scope of the contractor shall be procured from Primary Steel Producers (Refer NOTE below). Currently, Primary Steel Producers acceptable are SAIL, JSW Steel Ltd, Jindal Steel & Power, Tata steel Ltd. (for Reinforcement steel/TMT bars), RINL (for long products/Rolled sections and Reinforcement steel/TMT bars), Essar Steel India Ltd. (for Flat products/ Steel Plates), Electrosteel steel Ltd. (for Reinforcement steel/TMT bars) and Monnet Ispat and Energy Ltd. (for long products/Rolled sections and Reinforcement steel/TMT bars). Subsequently, if any new Primary Steel Producer/s are proposed during execution of contract, the same may be considered for acceptance subject to meeting the following qualifying requirements: i) The proposed supplier should be a Primary Steel Producer, having a minimum production capacity of one million tons per annum (MTPA). ii) The proposed supplier should be a regular manufacturer of Steel Plates and / or Rolled Sections and / or Reinforcement Steel for the last two years as on date of submission of proposal. iii) The proposed supplier should also be a registered licensee with Bureau of Indian Standards for BIS:1786/2062 at the time of submission of proposal.

<table>
<tr>
<td>19</td>
<td>VI/B</td>
<td>IIIC-02
Annexure
IIIC-02K</td>
<td>2 of 3</td>
<td>1.04.02</td>
<td>In fieldbus system following spare capacity in each FG shall be provided……. proportion to fieldbus/ conventional system implementation.</td>
<td>In fieldbus system following spare capacity in each FG shall be provided:
<table>
<tr><th>Sr. No (1)</th><th>Item (2)</th><th>Sub-Item (including description) (3)</th><th>Spare Capacity (4)</th><th>Spare Space (5)</th></tr>
<tr><td rowspan="5">1</td><td rowspan="5">Foundation Fieldbus</td><td>Wired in space for mounting FF Host modules along with backplane / base / rack for future expansion.</td><td></td><td>20 % of Engineered quantity of Host modules</td></tr>
<tr><td>Spare capacity in the redundant power supplies</td><td>20 % over and above Engineered capacity</td><td>-</td></tr>
<tr><td>FF Segment Loading (Limited to a maximum of 12 nos. devices with a minimum voltage across each device of 11 V DC)</td><td>Out of each segment capacity calculated as per column (3), spare capacity of 2 nos. as a minimum for future expansion per segment shall be provided</td><td>-</td></tr>
<tr><td>No of spare channels in the field mounted FF Junction boxes / distributors</td><td>Minimum 4 nos. in each JB / distributor</td><td>-</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Profibus DP</td><td>Wired in space for Redundant DP masters with required backplane / rack / base for expansion</td><td></td><td>Space for 1 set</td></tr>
<tr><td>Capacity in redundant DP masters</td><td>20 % of Engineered DP segment capacity for DP devices</td><td></td></tr>
<tr><td>3</td><td>Profibus PA</td><td>Wired in space for mounting PA segment modules along with required backplane / rack / base for future expansion</td><td></td><td>20 % of supported PA segment modules by each</td></tr>
</table>
</td>
</tr>
</table>

										DP/PA coupler/link
								Capacity in the redundant DP / PA coupler / link modules and corresponding DP masters for future expansion	20 % over and above engineered capacity	-
								Spare capacity in the redundant power supplies	20 % over and above designed rating	-
								PA Segment Loading (Limited to a maximum of 12 nos. devices with a minimum voltage across each device of 11 V DC)	Out of each segment capacity calculated as per column (3), spare capacity of 2 nos. as a minimum for future expansion per segment shall be kept	-
								Channels in the field mounted Profibus PA Junction boxes / distributors	Minimum 4 nos. in each JB / distributor	-
						4	Controller(s)/ system module(s)	These shall have spare hardware and software capacities, over and above engineered capacities, to cater to spare requirements defined above, for applicable items of S.No.1,2,3 along with their spare capacities defined in column (4) & (5)		

						The spare functional capacity of controller defined in Clause no 2.01.03 of Appendix-I to Sub-section-IIC-01 (Contract Quantities for DDCMIS Item), Part-A of Technical Specification will be applicable for both conventional and fieldbus based system (combined together).
20	**VI/B**	IIIC-18	**10 of 10**	**11.02.02**	**Multi Input Temperature transmitter (Temperature Multiplexer)** For only information related temperature inputs fieldbus based Multi input temperature transmitters can be provided. Transmitters shall be capable of withstanding ambient temperature upto 85 deg C. Maximum number of inputs per such temperature transmitter shall be eight. These shall be mounted in standard enclosures available along with manufacturer of such TTs, with minimum IP-67 protection class. Exact applications shall be as defined in PART-A of specifications.	**Multi Input Temperature transmitter (Temperature Multiplexer)** For only information related temperature inputs fieldbus based Multi input temperature transmitters can be provided. Transmitters shall be capable of withstanding ambient temperature upto 85 deg C. Maximum number of inputs per such temperature transmitter shall be eight. **One (1) no. input shall be kept as spare wired upto TBs of panel in each multi input TT. These shall be mounted in panels with minimum IP 55 protection class.** Exact applications shall be as defined in PART-A of specifications.

<table>
<tr>
<td>21</td>
<td>VI/B</td>
<td>IIIC-02</td>
<td>22 of 26</td>
<td>8.04.01</td>
<td>All the relays provided by Contractor shall be suitable for control supply of 24V DC. Each relay shall have 2 changeover type contacts & the rating of contacts shall be 5 Amp at 240V AC & 0.2A at 220V DC. The VA burden of relays shall be suitable to match the capacity of output modules (however, it shall not be more than 2.5 VA). Each relay shall be provided with a freewheeling diode. The relays shall be mounted in relay cabinets except for cases where number of relays is very less. In the cases where the number of relays is very less, the same can be mounted in termination / marshalling cabinets. All the contacts of relays shall be wired upto the cabinet terminal blocks.</td>
<td>All the relays provided by Contractor shall be electromechanical type suitable for control supply of 24V DC meeting following specification requirements:
<table>
<tr><th>Sl. No.</th><th>Description</th><th>1 COC Slim Relay(< 7mm)</th><th>2 COC Heavy Duty Relays</th></tr>
<tr><td>1</td><td>Application</td><td>for Signal Exchange and 24 V DC Solenoids</td><td>Other applications like Electrical Interface, Trip PB contact multiplication etc.</td></tr>
<tr><td>2</td><td>Operating Voltage</td><td>24 V DC</td><td>24 V DC</td></tr>
<tr><td>3</td><td>Complete Relay with base Width</td><td><7 mm</td><td>-</td></tr>
<tr><td>4</td><td>No. of Contacts</td><td>One changeover contact</td><td>Two changeover contacts</td></tr>
<tr><td>5</td><td>Contact material</td><td>AgNi/ AgSnO</td><td>AgNi/ AgSnO /Ag Alloy</td></tr>
<tr><td>6</td><td>Contact Rating</td><td>Min 6 A at 24 V DC/ 240 V AC</td><td>*Min 5 A at 240 V AC & 0.2A at 220 V DC</td></tr>
<tr><td>7</td><td>The Coil burden of relays</td><td><2.5 W at 24 V DC</td><td><2.5 W at 24 V DC</td></tr>
<tr><td>8</td><td>Relay Working voltage range / Release Voltage shall be in line with IEC 61810</td><td>80% to 110% of rated voltage/ 5% or higher of rated voltage</td><td>80% to 110% of rated voltage/ 5% or higher of rated voltage</td></tr>
<tr><td>9</td><td>Relay shall be capable to meet requirement of fast switching applications :
a. Operating time
b. Release time</td><td>a. Max 10 ms
b. Max 10 ms</td><td>a. Max 40 ms
b. Max 60 ms</td></tr>
<tr><td>10</td><td>Relay Electrical Life</td><td>Min 50000 operations at rated load</td><td>Min 100000 operations at rated load</td></tr>
<tr><td>11</td><td>Relay Mechanical Life</td><td>Min $5x10^6$ operations</td><td>Min 10^7 operations</td></tr>
<tr><td>12</td><td>Relay base with integral terminal blocks Mounting</td><td>DIN Rail</td><td>DIN Rail</td></tr>
<tr><td>13</td><td>Relay/ Relay base shall be provided with a freewheeling diode</td><td>Y</td><td>Y</td></tr>
</table>
</td>
</tr>
</table>

						14	Relay/ Relay base shall have LED indication for coil activation.	Y	Y
						15	Reverse Polarity Protection	Y	Y
						16	Relay connection type	Screw less connection like Push in/ Cage clamp/ Spring type	Screw/ Push in/ Cage clamp/ Spring type
						17	Jumpering provision	Relay base shall have provision for plug-in jumpering without need for additional wiring	-
						18	Standard Compliance	Relays along with base shall comply to CE, UL, ROHS, IEC61810 standards.	Relays along with base shall comply to CE, UL, ROHS, IEC61810 standards.
						19	Operating Temperature	Relay : 0-80 Deg C Complete relay with base : 0-60 Deg C	Complete relay with base : 0-45 Deg C
						20	The Insulation of the Relay Module between the coil & contact	4 kV at 50Hz for 1min	2kV at 50Hz for 1min
						21	Manual test lever/ latching provision	NOT to be provided	NOT to be provided

Notes:

1. *For Trip PB contact multiplication, contacts of these relays will be wired to switchgear and rating of contacts shall be 1A at 220V DC.
2. Relays along with base shall be from the same manufacturer.
3. These relays shall be mounted in relay cabinets except for cases where number of relays is very less (Less than 40). In the cases where the number of relays is very less the same can be mounted in termination / marshalling cabinets. All the contacts of relays shall be wired up to the cabinet terminal blocks.

22	**VI/A**	IIC	**15 of 33**	**4.00.00(e) ii**	For monitoring of Generator Core/ Slot temperature measurements ProfiBus / Foundation Field Bus Compatible temperature transmitters/ Wireless temperature transmitters are also acceptable. For Generator ……..	For monitoring of Generator Core/ Slot temperature measurements Profibus / Foundation Field Bus Compatible **Multi Input** temperature transmitters/ Wireless temperature transmitters are also acceptable. For Generator ……..
23	**VI/A**	IIC, APPENDIX-I TO SUB-SECTION-IIC-01 (CONTRACT QUANTITIES OF DDCMIS ITEM)	**2 of 7**	**2.01.04**	Ten (10) percent spare relays of each type and rating, mounted and wired in relay cabinets. All contacts of relays shall be terminated in terminal blocks of relay cabinets. In each of the relay cabinets, 10 % spare terminal blocks shall be provided so that additional relays can be mounted and wired.	**Contactor to provide thirty (30) percent spare relays for 1 COC Slim Relay (< 7mm) and ten (10) percent spare relays for 2 COC Heavy Duty relays. These relays** shall be mounted and wired in relay cabinets. All contacts of relays shall be terminated in terminal blocks of relay cabinets. In each of the relay cabinets, 10 % spare terminal blocks shall **also** be provided so that additional relays can be mounted and wired.
24	**VI/A**	IIC, APPENDIX-I TO SUB-SECTION-IIC-01 (CONTRACT QUANTITIES OF DDCMIS ITEM)	**2 of 7**	**2.01.06**	For HART System Spare Capacity, refer Part B, Annexure-IIIC-02C	**The above mentioned requirements are generally applicable for conventional system. For fieldbus based system refer Annexure IIIC-02K of Part-B for spare requirements. In FGs where mix of conventional and fieldbus based system is used, the spare shall be in the respective proportion.**

25	VI/A	IIC	27 OF 33	13.03.00 TO 13.09.00	13.03.00 Analyzers for measuring conductivity, Degased Cation Conductivity, pH, Hydrazine, Silica, Sodium ion, Dissolved Oxygen, Turbidity, Iron Analyser etc. as well as any other analyzer, as required and recommended by Contractor or OEM. 13.04.00 Unit-wise SWAS panels viz. Primary Sample conditioning rack (at Boiler Floor and Deaerator Floor), Secondary Sample conditioning panel (Wet panel in SWAS Room) and analyzer panel (Dry panel in SWAS Room) complete with valves, fittings, wiring etc. 13.05.00 PC based stations for display of information and alarm to operator to be located in each of the SWAS rooms (through station LAN) 13.06.00 Cooling water required for complete SWAS including primary coolers of boiler area & turbine area, secondary coolers, chiller etc. shall be provided from TG-ECW as indicated under Sub Section A-4 of Part-A and Tender Drawing No.- XXXX-000- POM-A-025 (for XXXX- refer to project specific code as indicated elsewhere in the specification). Contractor to provide all piping / fittings / valves etc. for cooling water supply for SWAS system. In case common chiller / Cooler is provided for two or more units, cooling water supply from ECW system of each Unit (through common header) shall be provided such that the SWAS system remains operable without loss of functions, even if ECW cooling water supply is available from any one of the Unit. 13.07.00 All the chemical, reagents required for 12 months operation is to be supplied in phased manner depending on shelf life in addition to that indicated under mandatory spares. 13.08.00 All analysers etc. are to be supplied on as required basis subject to the minimum requirement of SWAS Analysers as indicated in Contract Quantities for SWAS ,	13.03.00 All analysers are to be supplied on as required basis subject to the minimum requirement as indicated in Contract Quantities for SWAS , Appendix-I to Part-A, Section-VI, “Contract Quantities other than DDCMIS Items, of technical specification to make the system complete in line with the intent of this specification. However any other analyzer, as required and recommended by Contractor or Qualified steam Generator Manufacturer (QSGM) / Qualified steam Turbine Generator manufacturer (QSTGM) shall also be supplied by the contractor within the quoted contract price. 13.04.00 Unit-wise SWAS panels viz. Primary Sample conditioning rack (at Boiler Floor and Deaerator Floor), Secondary Sample conditioning panel (Wet panel in SWAS Room) and analyzer panel (Dry panel in SWAS Room) complete with valves, fittings, wiring etc. 13.05.00 Information and alarm signals from SWAS system shall be hooked up to Unit DDCMIS for monitoring purpose. For display of information and alarm to local operator, a PC based station shall be provided in each of the SWAS rooms, which shall be connected with Unit DDCMIS through station LAN. 13.06.00 Cooling water required for complete SWAS including primary coolers of boiler area & turbine area, secondary coolers, chiller etc. shall be provided from TG-ECW as indicated under Sub Section A-4 of Part-A and Tender Drawing No.- XXXX-000- POM-A-025 (for XXXX- refer to project specific code as indicated elsewhere in the specification). Contractor to provide all piping / fittings / valves etc. for cooling water supply for SWAS system. In case common chiller / Cooler is provided for two or more units, cooling water supply from ECW system of each Unit (through common header) shall be provided such that the SWAS system remains operable without loss of functions, even if ECW cooling water supply is available from any one of the Unit. 13.07.00 All the chemicals and reagents required for initial commissioning and warranty period (18 months operation after successful commissioning) of SWAS is to be supplied in phased manner depending on shelf life, in addition to that indicated under mandatory spares. Contractor shall initially supply reagents for two months operation, further supply shall be based on commissioning schedule of Units and confirmation by site Engineer. Contractor to provide shelf life of all reagents during detail Engineering. All the

					Appendix-I to Part-A, Section-VI, "Contract Quantities other than DDCMIS Items, of technical specification to make the system complete in line with the intent of this specification. 13.09.00 Comprehensive Annual Maintenance Contract (AMC) for three (03) years after warranty period shall be provided by the contractor for SWAS.	reagents supplied to site shall have at least 90% of remaining useful life at the time of dispatch. 13.08.00 For Scope of services of SWAS, refer cl.no.17.00.00 of this chapter
26	VI/B	IIIC-13			STEAM AND WATER ANALYSIS SYSTEM (SWAS)	**Chapter replaced –Refer Annexure-II**
27	VI/B	IIIC-10			TYPE TEST REQUIREMENTS	**Chapter replaced –Refer Annexure-I**
28	VI/A	IIC	10 of 33	2.04.15	DDCMIS vendor shall upgrade/ update all DDCMIS system along with TG LAN to the latest version/ release of DDCMIS system software/ patches, meeting the system software requirements as mentioned in Part-B, SUB-SECTION-IIIC-02 DDCMIS. This shall include the latest OS (validated with the DCS) and its corresponding latest version/ release of DDCMIS system software/ patches. The upgrade/ update shall be carried out in the penultimate year of AMC (In case of one year AMC, third month from the date of commencement of AMC). Any change in hardware required for the same shall also be carried out by the contractor within the contract price.	DDCMIS vendor shall upgrade/ update all DDCMIS system along with Station LAN to the latest version/ release of DDCMIS system software/ patches, meeting the system software requirements as mentioned in Part-B, SUB-SECTION-IIIC-02 DDCMIS. This shall include the latest OS **~~(validated with the DCS)~~** and its corresponding latest version/ release of DDCMIS system software/ patches. **The upgrade/update shall be checked for and carried out six months before the completion of** AMS of last DDCMIS (whose AMS started last). **~~(In case of one year AMS, third month from the date of commencement of AMS)~~**. Any change in hardware and the requisite services **(engineering/erection/commissioning/documentation)** required for the same shall also be carried out by the contractor within the contract price.

<table>
<tr>
<td>29</td>
<td>VI/A</td>
<td>IIC, APPENDIX-I TO SUB-SECTION-IIC-01 (CONTRACT QUANTITIES OF DDCMIS ITEM)</td>
<td>9 of 10</td>
<td>Table for HMI Quantities</td>
<td>
<table>
<tr><td></td><td>Station LAN</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>Units</td><td>Qty per unit</td><td>Qty-Common</td><td>Location</td><td>Remarks</td></tr>
<tr><td>Network Management Server alongwith Software</td><td>Set</td><td></td><td>1</td><td></td><td></td></tr>
<tr><td>…..</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Redundant TG LAN switch</td><td>sets</td><td></td><td>1</td><td></td><td></td></tr>
<tr><td>….</td><td></td><td></td><td></td><td></td><td></td></tr>
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</td>
<td>
<table>
<tr><td></td><td>Station LAN</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>Units</td><td>Qty per unit</td><td>Qty-Common</td><td>Location</td><td>Remarks</td></tr>
<tr><td>Network Management Server alongwith Software</td><td>Set</td><td></td><td>1</td><td></td><td></td></tr>
<tr><td>Redundant Management LAN</td><td>Set</td><td></td><td>1</td><td></td><td></td></tr>
<tr><td>….</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Redundant TG LAN switch</td><td>sets</td><td></td><td>1</td><td></td><td></td></tr>
<tr><td>Hardware Firewall in failover mode with IPS</td><td>Nos.</td><td></td><td>2</td><td></td><td></td></tr>
<tr><td>VPN Router for Remote Service Centre Connectivity</td><td>No.</td><td></td><td>1</td><td></td><td></td></tr>
</table>
</td>
</tr>
<tr>
<td>30</td>
<td>VI/A</td>
<td>IIC</td>
<td>10 of 33</td>
<td>2.04.13</td>
<td>Suitable hardware/software for interfacing of TG LAN of DDCMIS with following systems
Station level PLCs /PC's (as per Appendix-I to Part-A, Section-VI of Technical Specification).</td>
<td>Suitable hardware/software for interfacing of TG LAN of DDCMIS with following systems

Station level PLCs /PC's (as per Appendix-I to Part-A, Section-VI of Technical Specification).

It shall be responsibility of the Main Contractor that all of the above interfaces are established before COD (Commercial Operation Declaration) of first unit of the project.</td>
</tr>
</table>

31	VI/A	IIC	10 of 33	2.04.14	In order to test the Operating system patches/hot fixes & also other periodic software upgrades, a test server of the same configuration as the servers/workstations provided in HMI will be provided. …..	In order to test the Operating system patches/hot fixes & also other periodic software upgrades, a test server of the same configuration as the servers/~~**workstations**~~ provided in HMI will be provided. ……

Annexure-A

24.00.00 **Software Based Project Monitoring Tool:**

Key deliverables of online software based project monitoring tool shall be as follows:

1. Design & Development (Phase-I) – 2 month
2. Implementation (Phase-II) – 2 month
3. Handholding (Phase-III) – 2 months
4. Sustenance (Phase-IV) – 6 months

The consultant team shall have adequate Project Management & Technical experts in the required facets of Project Management. Part time engagement of Project Director and Domain experts also are envisaged throughout the lifecycle of the project. For speedy and cost effective solution it is proposed to deploy cloud based solution.

Agency shall be closely working with the owner's team during the above four phases and shall train the owner's team in carrying forward the system.

1. TECHNICAL / FUNCTIONAL REQUIREMENTS

PM software Tool shall help develop capabilities like project scheduling, resource management, and reporting capabilities to deliver the project on-time and within budget. Real-Time availability of critical issues across project execution hierarchy will help to sort out critical issues in time bound manner and arresting delays in Project activities. PM software Tool shall have following capabilities:

a) **Project Planning**

- L1, L2, L3 Work plan development (e.g., via templates)
- Preparation of an integrated schedule of Engineering, Supplies & Construction activities with proper linkages.
- Three months rolling plan (L3) for each package
- Project front handover and front over to the agency
- To support timing and scheduling (e.g., via Gantt charts and Pert charts).
- Control plan creation, modification and deletion
- To provide project baseline tracking, version control, audit trail and plan history
- Link multi-level project and task plans.
- To define project-specific phases, gating processes and milestones

- Integration of T&Ps, Manpower with activities
- Integration of existing owner's Systems viz C-Folder, ECM, Dreams, SAP etc with proposed software solution.

b) **Project Monitoring/Status Reporting**

- Monitoring and Alarm generation for Work Fronts, System, Major Milestones and other enablers etc
- Project Portfolio management
- Dashboards depicting Project Progress based on KPIs for critical information
- L2 and L3 network based Gantt, PERT chart, critical path and other MIS reports
- Progress monitoring w.r.t. L2 and L3
- Daily/Weekly/Monthly Progress reports.
- Tracking of Manufacturing and Supply of Materials as per BBU and linking to L2 schedule.
- S Curves for project progress and CAPEX
- Top-down and bottom-up visibility for Planners and Project Managers
- Multiple scenarios (what if analysis) and data linked to projects during execution
- Alerts and reports for control and compliance
- Business Intelligence and Analytics
- Forecast about critical activities and overall project at any given point of time

c) **Risk Management**

- Support project risk assessment and risk mitigation planning.
- Quantify project risk.
- Quantify project deferral risk (risks if the project is not conducted)
- Ability to evaluate risk-reward trade-offs.

d) **Data Management**

- Mobile Application for task management, progress updation
- Allow users to configure/customize/format views, graphs, and reports.
- Create, view, change, and delete projects and associated project data
- Accommodate a multiple project

- To conduct statistical analysis of historical data (e.g., trend analysis, bench marking).
- Import/export/Linking data from existing systems and databases (e.g., planning, financial systems, Engineering, Supply etc.)
- Integration of our existing Engineering for drawings, Contracts system for BBUs, ECM and SAP for Finance and other data
- Single platform for all projects of owner
- Web based interface
- Minimal data entry and avoid duplication of data

e) **Issue Management**

- Integration with existing issue tracking system

2. Scope of work

i. Supplying Project Management Software with system license with minimum validity of two years for minimum Fifty (50) concurrent users for : **10** licenses for MIS, **10** licenses for Planning and 30 licenses for Data Punching.

ii. Assess current status of the project and critically review the existing schedules and systems. Suggest a system to guide the project and develop and implement the same in consultation with Employer. Crash the schedule in case of need.

iii. Create a dashboard for monitoring and track the missing targets and identify the responsible team.

iv. Review current practices of reporting and to find gaps. Improve the current system by including latest technology and tools.

v. Review the existing milestones, correlation with project, pre-commissioning and commissioning activities and availability of work front.

vi. Combined schedule for monitoring the project and Managing Project baselines in terms of progress and cost.

vii. Web based accessed system, Mobile apps for dashboard and data updation.

2.1. KEY DELIVERABLES

Key deliverables shall be as per Supply and the four Phases of implementation

1. SUPPLY OF PROJECT MANAGEMENT SOFTWARE WITH SYSTEM LICENSE (FOR 2 YEARS) – WITHIN 2 MONTHS FROM START OF WORK

2. DESIGN & DEVELOPMENT (PHASE-I) – 2 MONTHS

a) Integrated Schedule Development
b) Project KPIs, roles and responsibilities for all key stakeholders
c) Activity break down structure, shall create a detailed Project Schedule with proper linkages
d) Project baselines
e) Gap analysis
f) Capability Development Roadmap
g) Ensure that the system is capable of being extended to other projects of owner by owner's team members
h) Define Governance and Escalation Points
i) Define and Design Risk Issue Management Process
j) Define and Design Communication Strategy
k) Define Process Automation Scope
l) Roadmap for Integration of existing owner's /Agency Systems viz C-Folder, ECM, Dreams, SAP etc. with proposed software solution
m) Submission of Blueprints

3. IMPLEMENTATION (PHASE-II) – 2 MONTHS

a) Configure Standard Reports, e.g, Project Status, Summary
b) Develop Custom Reports and Dashboard Format
c) Roll out of Daily/Weekly/Monthly Progress reports
d) Critical path report
e) Work front tracker for highlighting work front constraints (Fortnightly)
f) Integration of existing owner's /Agency Systems viz ECM, Dreams, SAP etc with proposed software solution
g) L2 and L3 network based Gantt, PERT chart, critical path and other MIS reports
h) Financial / Cost reports
i) Web based as well as Mobile app based access to users

4. HANDHOLDING (PHASE-III) – 2 MONTHS

a) Training and handholding support for the project team members

b) Site visits and support for Data updation
c) Changes and enhancement on feedback
d) Process Manuals and documentations
e) Conducting sessions through VC
f) Conducting Training Sessions (Breakup as below)

S. No.	Training type	No of training	No of man day each training	Total training man days
1.	System Administration and Maintenance Training	2	2	4
2.	End Users Training at Site/CC	6	2	12
3.	Planning User training at Site/CC	6	2	12
4.	Senior Level Training	6	½	3
5	Train the trainers	2	2	4
			Total	35

5. SUSTENANCE (PHASE-IV) – 6 MONTHS

a) Post Implementation Handholding
b) User acceptance testing
c) Project plan update with Team Member (Monthly)
d) Automated advance alert for project delays to all the related stakeholders
e) Updated Daily /weekly / Monthly project progress reports
f) Project Maturity Assessment
g) High availability of cloud platform
h) Capacity building training for Owner
i) Periodic backup of data in Owner's systems
j) 2 days Site visit, twice in a month
k) Recommendations
l) Installation of Backup system/software with minimal configuration at Owner's place

6. HELP DESK AND SUPPORT FOR 2ND YEAR- 1 YEAR

a) Identification of Major Project Milestones for timely achievement (2 milestones in each Project).
b) Remote (Telephone/ E-mail / internet / Installation visit) or In-Person (wherever required) support to be provided. One nodal person to be identified.
c) Development and modification in Dashboards/Reports
d) SLA reports, Monthly and quarterly utilization reports (peak and average volumetric details)
e) Monthly visit at PP&M to review and resolve issues pending / bugs
f) Handholding owner for implementing New Project Plans and systems
g) Ensure smooth running of the system

2.2. DEPLOYMENT SCHEDULE

a) Consultants deputed by bidder shall be professionally qualified and have the experience and deployment as envisaged below

S. No.	Role	Experience
1	**Project Director**	~15 years of experience in Project/ Programme management, project risks and execution management in large infrastructure projects, as defined elsewhere in the document
2	**Project Manager**	~10 years of experience in Project management, project risks and execution management in Power plant construction and Execution
3	**Technical Lead**	~10 years of experience in development/ implementation of PM Software including web, mobile apps and capability in interfacing with Owner's systems
4	**Monitoring consultant**	~5 years of onsite experience of Power project execution and monitoring
5	**MIS Expert**	~12 experience in designing reporting frame work, risk registers, project delivery process, intelligent project monitoring templates & BI templates

b) It is required to provide a list of the consultants proposed to be deployed for this project along with the proposal. The list should include a brief on qualification, experience and projects undertaken by each of the Consultant.

c) Additional Consultants will however be deployed as per requirements. But no additional payment shall be made. It is assumed that the payment has been included in the financial proposal.

d) Consultants to be deployed should be on the rolls of company for at least 1 year.

2.3. PROJECT LOCATION AND OTHER INFORMATION

Refer details provided elsewhere in the specification

24.01.00 Special conditions

a) No Server hardware will be provided by owner as solution is cloud based.

b) For connecting internal system of owner suitable hardware / software for secured access is to be provided and configured by agency in consultation with owner.

c) The change of consultant during execution of the project shall not be allowed. However, in exceptional circumstances with the permission of EIC, the replaced

consultant should have the above experience and seamlessly be able to integrate with the job including proper knowledge transfer.

d) Suitable accommodation will be provided at site during site visit subject to availability.

e) Start Date of the work would be reckoned as 30 days from the Date of Award. Hence, the successful bidder shall depute the implementation team within that period under intimation to the EIC. The office space and facility shall be provided by owner.

f) If the Engineer-in-Charge if not satisfied with the work of manpower deputed for the work, he may insist for replacement through written notice. After receiving such notice, the consultant shall depute replacement manpower with above experience within 3 days.

g) The consultants deployed by bidder shall carry their own Laptop for execution of work.

h) The total working during man-month is based on the calculation as per standard industry practice and shall be in line with the working hours and days of owner executives at location. It is the responsibility of bidder to ensure the availability of consultants.

i) The Services for "Support for 2nd Year onwards for Three Projects" will commence only after completion of all 4 phases on implementation, on certification to that effect by the EIC.

24.02.00 SOFTWARE / CLOUD

a) Platform as a Service (PaaS) on the cloud including infrastructure
b) Shall comply or meet any security requirements applicable to CSPs/Service Providers published (or to be published) by MeitY or any standards body setup / recognized by Government of India from time to time and notified to the CSP/Service Providers by MeitY as a mandatory standard.
c) The CSP/Service Provider shall meet all the security requirements indicated in the IT Act 2000, the terms and conditions of the Provisional Empanelment of the Cloud Service Providers and shall comply to the audit criteria defined by STQC
d) All the software procurement, installation for connection to ECM, Engg, CC&M or other systems shall be in scope of agency
e) Suitable workload for licenses procured to be provided on the cloud platform
f) Licenses will be in the name of Owner thru EULA
g) Data Retrieval /Backup to local as and when required
h) Data and platform security as per standards Guidelines issued by Ministry of Electronics and Information Technology.
i) Software & Licenses for PM tool
j) Software & licenses for Database Solution
k) Software & licenses for Backup Solution (if applicable)

l) Software & licenses for Software for Application Server (if applicable) Connectors
m) Exit Management Plan and migration to Other system if required
n) Any other software components required
o) Application Programming interface (API) for development
p) Multi user access
q) Minimal Customization of the standard solution
r) Application for updates and patches throughout licensing period
s) Further, during this period, it will be the responsibility of the agency to maintain and support the system fully and ensure that the level of availability is 95%
t) Cloud Licenses will be for minimum of Two years with option for extending the licenses for at least two more years after completion of facilities of last unit in the project.

24.03.00 LIQUIDATED DAMAGES

1.0 APPLICABLE FOR SUPPLY AND PHASE-I TO PHASE-IV OF IMPLEMENTATION

Supply:
In the event of Supplier's failure to deliver the material of acceptable quality within the stipulated delivery period, the liquidated damages are payable by the Supplier @ 0.5% (one half of one percent) per week of delay or part thereof, of the unexecuted total item value

Implementation:
In the event of Supplier's failure to complete the phase wise implementation within the stipulated period, the liquidated damages are payable by the Supplier @ 0.5% (one half of one percent) per week of delay or part thereof, of the unexecuted total item value.

LD levied for each of the phases of implementation, whenever applicable, are independent of each other and are applicable separately and concurrently. However, the total liability of the bidder under this clause shall not exceed 5% of the Total Implementation Cost.

However, in case of delay due to reasons beyond the control of the Consultant, suitable extension of time may be granted.

2.0 APPLICABLE FOR 2ND YEAR WORK

Sr. No. (a)	Measurement (b)	Definition (c)	Target (d)	LD (e)
1	Business Standstill	If the solution is unavailable either due to software bug or cloud unavailability and blocks the execution of the primary business process. A workaround is not possible. A business-critical part of an application is not available. A workaround is not possible. Business-critical function cannot be executed. A workaround is not possible.	Resolution Within 0-6 hours	Nil
			Resolution Within 6 hours- 1day	(Total Year charges for Support for 2nd Year) / 365 X 1
			Resolution beyond 1 day	2 X (Total Year charges for Support for 2nd Year) / 365 X No of days
2	Regular Fault	• A non-business critical part of an application is unavailable. A workaround is not possible but the user is able to achieve a normal productivity level. • The problem has few consequences for the user and workaround is possible. Most of the functions operate normally.	Resolution Within 1 day	Nil
			Resolution Within 1- 5 days	(Total Year charges for Support for 2nd Year) / 365 X No of days
			Resolution beyond 5 days	2 X (Total Year charges for Support for 2nd Year) / 365 X No of days
3	No immediate impact to business	The problem has few consequences for the user and there is a workaround. The application or its parts are used by a very few users & the unavailability will not affect business.	Resolution Within 2 days	Nil
			Resolution Within 2- 10 days	(Total Year charges for Support for 2nd Year) / 365 X No of days
			Resolution beyond 10 days	2 X (Total Year charges for Support for 2nd Year) / 365 X No of days
4	Absence of Executive Consultant	As per requirement in different phases	Upto 2 working days in a month	Nil
			2-7 working days in a	Rs 5000 per day per person

			month	
			more than 7 working days in a month	Rs 10000 per day per person
5	Non Achievement of Major Project Milestones in three Projects	Milestones will be minimum and not limited to the milestones as identified in bid documents and shall be jointly finalized by bidder and owner. If there is any delay beyond the control of agency which accepted by owner an extended time is provided, then target time will be extended	No delay	NIL
			Delay upto 2 Months	5 X (Total Year charges for Support for 2nd Year) / 365
			Delay beyond 2 Months	10 X (Total Year charges for Support for 2nd Year) / 365

24.04.00 PENALTY FOR ATTRITION OF PROJECT TEAM MEMBER(S)

a) For all incidents of replacement of key personnel beyond two, Consultant shall be penalized for bad delivery and material breach. Penalty for each such replacement of key personnel shall be INR 1 lacs.

b) In the event that the owner identifies any personnel of Consultant as "Key Personnel", then Consultant shall not replace such personnel without a notice period of not less than two months to owner and prior written consent of the owner, unless such replacement is the result of an unavoidable circumstances like termination due to incompetence/unethical practices/etc, medical leave, death (or any other similar reason to be solely decided by owner in each case) and insistence of owner due to reasons stated in subsequent paras. After statutory notice by Consultant and written consent of owner, the substitution of such key personnel shall be accomplished pursuant to a mutually agreed upon schedule but not later than 15 Days prior to the date of exit of such personnel and with a minimum overlapping period of 15 working days with complete onsite knowledge transfer among the two key personal (i.e. outgoing and incoming). Knowledge transfer shall be documented in detail with one copy to CLIENT for approval. If replacements do not take as stipulated here, owner will penalize the Consultant for bad delivery and material breach. Penalty for each such failure of Consultant in replacement of key personnel shall be Rs. One lac. Any delay in replacing the resource by more than 07 days from the time stipulated above shall be penalized at the rate of Rs. 50,000/- per seven days delay (up to a maximum of Rs. 10 Lakh) till the time resource is suitably placed on job.

c) Under any circumstances when the Key Personnel are to be replaced, Bidder shall always and immediately put forward the profiles of personnel being proposed as replacements. These profiles should be either equivalent or better than the ones being

replaced and shall be suitable match in competence. However, whether these profiles are better or equivalent to the ones being replaced will be decided solely by owner within a period of 3 working days (excluding the day of providing the profiles). Owner will have the right to accept or reject these substitute profiles. The replacement will be on board only after owner accepts the replacement. Time involved in this activity is included in the total time for replacement.

d) Owner by notice to the Bidder may object to any representative or person employed by the Consultant in the execution of the contract who, in reasonable opinion of the owner, may have behaved inappropriately, found to be unsuitable for the role for which deployed, negligent or is involved in unethical practices. Consultant shall remove such person unconditionally from work on the contract and promptly appoint a replacement as per the above methodology.

24.05.00 DOCUMENTS PREPARED BY THE BIDDER TO BE PROPERTY OF THE OWNER

a) All reports, manuals, and other documents (collectively referred to as "**Project Documents"**) submitted by the Bidder in performing the Services shall become and remain the property of the owner, and all intellectual property rights in such Project Documents shall vest with the owner. Any Project Document, of which the ownership or the intellectual property rights do not vest with the owner under law, shall automatically stand assigned to the owner as and when such project Document is created and the Consultant agrees to execute all papers and to perform such other acts as owner may deem necessary to secure its rights herein assigned by the Owner.

b) The Bidder shall, not later than termination or expiration of this Agreement, deliver all Project Documents to the owner, together with a detailed inventory thereof. The Consultant shall not retain any of such Project Documents. The Consultant, its Sub-Consultant or a Third Party shall not use these Project Documents for purposes unrelated to this Agreement without the prior written approval of the owner.

c) The Bidder shall hold the owner harmless and indemnified for any losses, claims, damages, expenses (including all legal expenses), awards, penalties or injuries (collectively referred to as "Claims") which may arise from or due to any unauthorised use of such Project Documents, or due to any breach or failure on part of the Consultant or its Sub-Consultant or a Third Party to perform any of its duties or obligations in relation to securing the aforementioned rights of the owner.

d) Personnel assigned by the Bidder to perform the Services and under no circumstances shall such personnel be considered employees of owner. The Consultant shall have the sole responsibility for the supervision and control of the personnel deployed in the Project and for payment of such personnel's compensation, including salary, withholding of income taxes and social security taxes, worker's compensation, employee

and disability benefits and the like and shall be responsible for all obligations of Client subject to Applicable Law.

e) Each Party shall be responsible for the performance of all its obligations under this Agreement or the SLA as the case may be and shall be liable for the acts and omissions of its employees and agents in connection therewith. Neither Party will solicit for employment or knowingly hire an employee of the other Party with whom such Party has contact pursuant to project engagements under this Agreement. This restriction shall not apply to employees of either Party responding to advertisements in job fairs or news media circulated to the general public.

24.06.00

1.1. TRANSFER OF ASSETS

a) Owner shall be entitled to serve notice in writing to the Bidder at any time during the exit management period as detailed herein above requiring the Bidder to provide the owner with a complete and up to date list of the Assets within one week of such notice. Owner shall then be entitled to serve notice in writing on the Bidder at any time prior to the date that is 30 days prior to the end of the exit management period for transfer of all assets as per mutually agreed schedule to owner.

b) In case of contract being terminated, owner reserves the right to ask Bidder to continue running the project operations for a period up to 6 months after termination orders are issued.

c) Upon service of a notice under this Article the following provisions shall apply:

i. Payment to the outgoing Bidder shall be made to the tune of last set of successfully completed services / deliverables as per contract, subject to SLA requirements.

1.2. CONFIDENTIAL INFORMATION, SECURITY AND DATA

The Bidder will promptly on the commencement of the exit management period supply to the owner the following:

i. Information and data relating to the current services rendered;
ii. Documentation relating to the project's Intellectual Property Rights;
iii. All current and updated data in a readily available format as is reasonably required for purposes of owner taking over the system or transitioning the services to its Replacement Bidder nominated by the owner.

1.3. TRANSFER OF CERTAIN AGREEMENTS

On request by the owner, the Bidder shall effect such assignments, transfers, licenses and sublicenses as owner may require in favour of the owner or its Replacement Bidder in

relation to any equipment lease, maintenance or service provision agreement between Bidder and third party lessors, vendors, and which are related to the services and reasonably necessary for the carrying out of replacement services by the owner or its Replacement Bidder.

a) During the exit management period, the Bidder shall use its best efforts to deliver the services.
b) Payments during the Exit Management period shall be made in accordance with the Terms of Payment Schedule.
c) This Exit Management plan shall be furnished in writing to the owner within 30 days from the Date of award.

1.00.00 **TYPE TEST REQUIREMENTS**

1.01.00 General Requirements

1.01.01 The Contractor shall furnish the type test reports of all type tests as per relevant standards and codes as well as other specific tests indicated in this specification. If the bidder proposes a different standard/code from that indicated at clause no 2.01.00 and at table 3.00.00, same is acceptable provided the equivalence of the proposed standard is established by the bidder. A list of such tests are given for various equipment in table titled 'TYPE TEST REQUIREMENT FOR OTHER C&I SYSTEMS' at the end of this chapter and under the item “Special Requirement for Solid State Equipments/Systems”.

(a) Out of the tests listed, the Bidder/ sub-vendor/ manufacturer is required to conduct certain type tests specifically for this contract (and witnessed by Employer or his authorized representative) even if the same had been conducted earlier, as clearly indicated subsequently against such tests.

(b) For the rest, submission of type test results and certificate shall be acceptable provided.

i. The same has been carried out by the Bidder/ sub-vendor on exactly the same model /rating of equipment.

ii. There has been no change in the components from the offered equipment & tested equipment.

iii. The test has been carried out as per the latest standards along with amendments as on the date of Bid opening.

(c) In case the approved equipment is different from the one on which the type test had been conducted earlier or any of the above grounds, then the tests have to be repeated and the cost of such tests shall be borne by the Bidder/ sub-vendor within the quoted price and no extra cost will be payable by the Employer on this account.

1.01.02 The schedule of conduction of type tests/ submission of reports shall be submitted and finalized during pre-award discussion.

1.01.03 For the type tests to be conducted, Contractor shall submit detailed test procedure for approval by Employer. This shall clearly specify test setup, instruments to be used, procedure, acceptance norms (wherever applicable), recording of different parameters, interval of recording precautions to be taken etc. for the tests to be carried out.

1.01.04 The Bidder shall indicate in the relevant BPS schedule, the cost of the type test for each item only for which type tests are to be conducted specifically for this project. The cost shall only be payable after conduction of the respective type test in presence of authorize representative of Employer. If a test is waived off, then the cost shall not be payable.

2.00.00 **SPECIAL REQUIREMENT FOR SOLID STATE EQUIPMENTS/ SYSTEMS**

2.01.00 The type test reports which are to be submitted for each of the C&I systems(indicated in clause 2.01.01) shall be as indicated below:

i) Surge Withstand Capability (SWC) for Solid State Equipments/ Systems

All solid state systems/ equipments shall be able to withstand the electrical noise and surges as encountered in actual service conditions and inherent in a power plant. All the solid state systems/ equipments shall be provided with all required protections that needs the surge withstand capability as defined in ANSI / IEEE C37.90.1.. Hence, all front end cards/ devices which receive external signals like Analog input & output modules, Binary input & output modules etc. including power supply, data highway, data links shall be provided with protections that meets the surge withstand capability as defined in ANSI / IEEE C37.90.1. Complete details of the features incorporated in electronics systems to meet this requirement, the relevant tests carried out, the test certificates etc. shall be submitted along with the proposal. As an alternative to compliance to ANSI / IEEE C37.90.1, the system shall comply to IEC-61000-4-4, IEC-61000-4-5 and IEC-61000-4-18.

ii) Dry Heat test as per IEC-60068-2-2 or equivalent.

iii) Damp Heat test as per IEC-60068-2-30 or IEC-60068-2-78 or equivalent.

iv) Vibration test as per IEC-60068-2-6 or equivalent.

v) Electrostatic discharge tests as per IEC 61000-4-2 or equivalent.

vi) Radio frequency immunity test as per IEC 61000-4-6 or equivalent.

vii) Electromagnetic Field immunity as per IEC 61000-4-3 or equivalent.

2.01.01 **C&I Systems-**

Sl. No	Item	Remark	Test To Be Specifically Conducted	NTPC's Approval Req. On Test Certificate
1	Control System of DDCMIS		No	Yes
2	PLC, excluding its HMI	Not applicable for integral PLCs and PLCs which are governed by standard practice of OEM	No	Yes
3	VMS System (Applicable for each module of VMS)		No	Yes
4	Main Turbine & BFP Drive Turbine TSI System (Applicable for each module of TSI System)		No	Yes
5	Vibration Analysis System (Applicable for each module of Vibration Analysis System)		No	Yes

6	TG related Special modules like Auto synchronizer, Load transducer module and speed measurement module		No	Yes
7	Master Clock		No	Yes

Note:

Type Tests are to be conducted only for the items, which are being supplied as a part of this Package.

3.00.00 **TYPE TEST REQUIREMENT FOR OTHER C&I SYSTEMS**

Sl. No	Item	Test Requirement	Standard	Test To Be Specifically Conducted	NTPC's Approval Req. On Test Certificate
Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
1	Electronic transmitter	As per standard (col 4)	BS-6447 / IEC-60770	No	Yes
2	Instrumentation Cables Twisted & Shielded*				
	-Conductor	Resistance test	VDE-0815	No	Yes
		Diameter test	IS-10810	No	Yes
		Tin Coating test (Persul-phate test)	IS-8130	No	Yes
	-Insulation	Loss of mass	VDE 0472	No	Yes
		Ageing in air ovens**	VDE 0472	No	Yes
		Tensile strength and elongation test before and after ageing**	VDE 0472	No	Yes
		Heat shock	VDE 0472	No	Yes
		Hot deformation	VDE 0472	No	Yes
		Shrinkage	VDE 0472	No	Yes
		Bleeding & blooming	IS-10810	No	Yes
	-Inner sheath***	Loss of mass	VDE 0472	No	Yes
		Heat shock	VDE 0472	No	Yes
		Cold bend/ cold impact test	VDE 0472	No	Yes
		Hot deformation	VDE 0472	No	Yes

		Shrinkage	VDE 0472	No	Yes
	-Outer sheath	Loss of mass	VDE 0472	No	Yes
		Ageing in air ovens**	VDE 0472	No	Yes
		Tensile strength and elongation test before and after ageing**	VDE 0472	No	Yes
		Heat shock	VDE 0472	No	Yes
		Hot deformation	VDE 0472	No	Yes
		Shrinkage	VDE 0472	No	Yes
		Bleeding & blooming	IS-10810	No	Yes
		Colour fastness to water	IS-5831	No	Yes
		Cold bend/ cold impact test	VDE-0472	No	Yes
		Oxygen index test	ASTMD-2863	No	Yes
		Smoke Density Test	ASTMD-2843	No	Yes
		Acid gas generation test	IEC-60754-1	No	Yes
	-fillers	Oxygen index test	ASTMD-2863	No	Yes
		Acid gas generation test	IEC-60754-1	No	Yes
	-AL-MYLAR shield	Continuity test		No	Yes
		Shield thickness		No	Yes
		Overlap test		No	Yes
	-Over all cable	Flammability	IEEE 383	No	Yes

Test			
Swedish Chimney Test	SEN 4241475	No	Yes
Noise interference	IEEE Trans-actions	No	Yes
Dimensional checks	IS 10810	No	Yes
Cross talk	VDE-0472	No	Yes
Mutual capacitance	VDE-0472	No	Yes
HV test	VDE-0815	No	Yes
Drain wire continuity		No	Yes

* 1.0 All cables to be supplied shall be of type tested quality. The Contractor shall submit for Owner's approval the reports of all the type tests as listed in this specification and carried out within last Ten years from the date of bid opening. These reports should be for the tests conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.

2.0 In case the Contractor is not able to submit report of the type test(s) conducted within last Ten years from the date of bid opening, or in case the type test report(s) are not found to be meeting the specification requirements, the Contractor shall conduct all such tests either in an independent laboratory or at manufacturer's works in presence of Owner's representative under this contract free of cost to the Owner and submit the reports for approval.

**These tests shall be carried out as per VDE0207 Part 6 & ASTMD-2116 for TEFLON insulated & outer sheathed cables

***Applicable for armoured cables only

3 DC Power Supply System (Applicable for each model and rating)

1)The Type Test reports for offered rectifier module and the controller module irrespective of the rectifier bank shall be acceptable

Surge Withstand Capability(SWC)	(ANSI / IEEE C37.90.1)or (IEC-61000-4-4, IEC-61000-4-5 and IEC-61000-4-18).	No	Yes
Dry Heat Test	IEC-60068-2-2 or equivalent	No	Yes

		Damp Heat test	IEC-60068-2-30 or IEC-60068-2-78 or equivalent	No	Yes
		Vibration test	IEC-60068-2-6 or equivalent	No	Yes
		Electrostatic discharge test	IEC 61000-4-2 or equivalent	No	Yes
		Radio frequency immunity test	IEC-61000-4-6 or equivalent	No	Yes
		Electromagnetic field immunity	IEC 61000-4-3 or equivalent	No	Yes
		Degree of Protection	IS-13947 or equivalent	No	Yes
4	Battery ##	As per standard (col 4)	IS-10918 (Ni-Cd Batteries)	No	Yes
			IS-1652 (Lead Acid Plante Batteries)	No	

5 UPS (Applicable for each model and rating)

1) Type Test reports of same series of UPS with similar PCB's cards and controllers as the target UPS system shall be acceptable.

2) For Dry heat, Damp heat and vibration, the tests conducted on individual PCB's shall be acceptable.

	Surge Withstand Capability(SWC)	(ANSI / IEEE C37.90.1)or (IEC-61000-4-4, IEC-61000-4-5 and IEC-61000-4-18).	No	Yes
	Dry Heat Test	IEC-60068-2-2 or equivalent	No	Yes
	Damp Heat test	IEC-60068-2-30 or IEC-60068-2-78 or equivalent	No	Yes
	Vibration test	IEC-60068-2-6 or equivalent	No	Yes

		Electrostatic discharge test	IEC 61000-4-2 or equivalent	No	Yes
		Radio frequency immunity test	IEC-61000-4-6 or equivalent	No	Yes
		Electromagnetic field immunity	IEC 61000-4-3 or equivalent	No	Yes
		Degree of protection test	IS-13947	No	Yes
		Fuse Clearing Capability	Approved procedure	No	Yes
		Short Circuit current capability	IEC 60146-2	No	Yes
6	Public Address System				
	IP based PA system components	As per Standard	IEC 60268-16	No	Yes
7	Control Valves	CV test	ISA 75.02& 75.11	No	Yes
8	Flow Nozzle Orifice plates	Calibration	ASME PTC BS 1042	No	Yes

The contractor shall submit for Employers approval the reports of all the type test as per latest IS-10918 carried out within last ten years from the date of Bid opening and the test(s) should have been either conducted at an independent laboratory or in presence of owner's representative. The complete type test reports shall be for any rating of Battery in a particular group based on plate dimensions being manufactured by supplier.

Note:

Type Tests are to be conducted only for the items, which are being supplied as a part of this Package.

STEAM AND WATER ANALYSIS SYSTEM (SWAS)

1.00.00 STEAM AND WATER ANALYSIS SYSTEM (SWAS)

1.01.00 The purity of the condensate, feed water, steam etc. shall be continuously monitored through online analysis system. The exact sample points, their location, type of chemical analysis to be carried out for each sample, measurement ranges etc., shall be subject to the approval of the Employer. The system shall be designed in accordance to the recommendations of latest versions of ASME PTC 19.11, ASTM D 1066, ASTM D 3370 and ASTM D 5540.

1.02.00 The Contractor shall provide the chemical analysis system as a composite system including sample piping, valves, grab sample collection facility, gauges/indicators, coolers, on-line analyzers etc. The SWAS shall include the following as a minimum meeting the technical requirement as indicated herein.

1.03.00 The Contractor shall be fully responsible on system basis, for proper engineering, selection of hardware, manufacture, testing, installation, commissioning and satisfactory functioning of complete and fully operational steam and water analysis system meeting the intent of this specification. All system components and accessories required for completeness of this system shall be furnished by the Contractor although these may not be individually specified herein. All system components shall be completely assembled, piped, wired and tested at the factory and shall be ready for installation when received at the project site.

1.04.00 All piping, tubing, fittings and other wetted parts in the sampling and analyzing system shall be of ASTM A182/213/312-316SS Grade material for the service approved by the Employer. No plastics or rubber shall be permitted except within analysers as recommended by the manufacturer.

1.05.00 Information and alarm signal from SWAS system including analyzers/monitor output signals, chiller system etc. shall be hooked up to DDCMIS for monitoring purpose.

1.06.00 All sample tap-off shall be designed for collecting the isokinetic sample complying the code ASTM D1066 (refer Sub-section-A-03 Steam Generator & Auxiliaries Including ESP Chapter, Part-B of technical specification).

2.00.00 SWAS PANELS

2.01.00 The SWAS panels shall comprise of two panels viz. Secondary Sample Conditioning Panel (Wet Panel) and Analyser Panel (Dry Panel). Wet panel shall house bulk head type fittings, removable cartridge type filters, pressure reducing elements, flow rate control, secondary coolers, grab sample valve and other sample conditioning equipments. For each sample, pressure gauge, temperature gauge, flow indicator, back pressure regulating valve, grab sample valve shall be provided on front of panel. The grab sampling facility and quick disconnect patch board facilities shall be provided on this panel.

2.02.00 Dry Panel shall house cells, analyzers, monitors etc.

2.03.00 The above panels shall be physically separate from each other and shall be mounted in the air-conditioned SWAS room. Wet panel shall be corridor type with walkway construction with side doors & removable type plate at the back. The dry panel shall be free standing & totally enclosed construction with back doors. The panels shall be constructed of 2.5mm thick SS316 plates except for doors, which shall be of 2.0mm thickness SS316 plate. The panel floor shall be made of SS 316 sheet of 5mm thickness with central flat portion for walk way and slightly sloping sections towards front and rear side and a panel drain. The waste water/sample from panel drain shall be piped to the nearest plant drain. All piping shall be concealed/ through trenches. The overall dimensions of wet panel and dry panel shall be 3300(W)x2400(H)x2000(D)mm and 3500(W)x2400(H)x1000(D)mm respectively as a

	minimum. However, increase in panel size, if required, shall be taken care of by the Contractor without any price implications to the Employer. All SWAS panels shall be furnished with 100mm base angle for bolting to 100mm high concrete. The foundation details, layout and general arrangement of these panels shall be subject to Employer's approval. Wet and dry panels of not more than two units shall be placed in one SWAS room.
2.04.00	Arrangement of equipment shall be generally as per ASME PTC 19.11 subject to Employer approval during detail Engineering.
2.05.00	PC-based operator station, with color laser printer for monitoring & alarming (Hooked up to station wide LAN of the DDCMIS system) (for PC specification, refer Sub-Section: DDCMIS) shall be provided by the Contractor.
2.06.00	**SAMPLE CONDITIONING SYSTEM**
2.06.01	The sample conditioning system (Wet Panel) shall provide samples at 25°C or a preset temperature required by the analyzer within tolerance of ±1°C, at a pressure of about 2kg/cm2 and at flow rates as required by individual analyzers/streams. Sample line to analyzer elements shall incorporate an anti-siphon design to prevent possibility of running dry because of a broken or plugged sample line. All fittings, pipes & other wetted parts shall be ASTM A182/312 316SS.
2.06.02	Sample conditioning system shall be designed and constructed to receive and condition all samples as required by the respective analyzers connected to the sample streams. This will include all conditioning as specified herein and shall cover the followings: a) Primary sample cooling (wherever specified) in the field. b) High pressure reduction (wherever specified) in the field. c) Two nos. racks shall be provided per unit by the Contractor for mounting primary coolers and high pressure reducing elements in the field along with all required piping, fittings, and accessories. The exact grouping and location of these racks shall be as finalized during detail engineering stage. d) Sample filtering. e) Secondary sample cooling and temperature control. f) Pressure reduction and control as required. g) Flow rate control and measurement. h) Other treatment as required by individual analyzers or as specified herein.
2.07.00	Primary cooling of all samples having temperature in excess of 45°C shall be provided through an individual sample cooler (primary cooler) with SS304 body, submerged helical coil (SS316H) type of shell and tube design with removable shell. The primary coolers shall use condensate quality (DM) plant equipment cooling water. The design, construction materials and technical features of the cooler shall be subject to Employer's approval. However, the sizing of the coolers should consider total sample flow plus 500ml/min grab sample & a fouling factor of 0.2. The capacity calculation shall be subject to Employer's approval during detailed engineering. All the pipes, fitting & valves required for cooling water for the primary coolers (supply and return lines) shall be provided by the Contractor. Provision shall be made for heat exchanger shell drain duly valved and piped to waste drain header by the Contractor.

	The Contractor shall also provide pipe from the waste drain header to the nearest building drain. Thermal protection **devices (Thermal shut-off valve)** as per ASME PTC 19.11 (Section 5) to be provided in the sample lines at the primary cooler outlets. All the pipes, fitting & valves in the primary rack shall be of SS316H.
2.08.00	Each sample stream with the required flow rate shall be finally cooled to 25°C±1°C or to a preset temperature required by the analyzer through an individual secondary cooler before passing the sample to the respective measuring cells and analyzer. The capacity calculation (considering fouling factor of 0.2) shall be subject to Employer's approval during detailed engineering. The secondary cooler shall also use condensate quality chilled water at 20°C. Chilled water for secondary cooler shall be provided by packaged refrigeration unit (chillers) to be provided by the Contractor. All samples will be passed through cartridge type filters before being cooled in respective secondary coolers. The secondary coolers shall also be of submerged helical coil (SS316) type of shell and tube design with SS304 body. Secondary cooler shall be protected by a relief valve on the cooling water jacket of each cooler in addition to a relief valve at the cooling water header. Provision shall be made for heat exchanger shell drain duly valved and piped to waste drain header to be supplied by the Contractor. The Contractor shall also provide pipe from the waste drain header and connect to the nearest building drain.
2.09.00	**Chiller System** (1) One set of 2x100% capacity water cooled chillers shall be provided by Contractor in each SWAS room. (2) Each chiller unit shall be designed with sufficient refrigeration capacity to ensure each sample stream temperature to 25°C±1°C when all streams are simultaneously at maximum flow rate and maximum temperature. The chiller capacity shall have a provision of 25% spare capacity for future samples. (3) Suitable temperature monitoring and control systems shall be provided for maintaining the chilled water temperature at chiller outlet at 20°C or at a designed preset value and within the desired band. (4) The compressor shall be readily accessible for service and shall include low noise hermetically sealed motors. Compressor assembly shall also include crank case heaters, suction and discharge valves, oil sight glasses, forced feed lubrication system and an integrated motor protection system along with the necessary instruments. (5) The condenser shall be water cooled, cleanable shell and tube with water regulating valve. The cooling water shall be arranged by Contractor from Equipment Cooling Water System of TG Package. All the pipes, fittings & valves required for to take the water from customer tapping point to the chiller shall be provided by the Contractor. (6) Chiller shall be of the direct expansion type with refrigerant tubes inside a shell, completely insulated and to be constructed in accordance with the ASME code for unfired pressure vessels. (7) Refrigerant circuit shall be complete with a thermostatic expansion valve, liquid line solenoid valve, sight glasses, filter-dryer, refrigerant shut-off and charging valves. (8) The chiller water pump shall be of the centrifugal type, close coupled, bronze fitted construction, complete with motor. Pump & motor shall be designed for continuous operation. (9) Vibration dampeners shall be mounted between the packaged chiller and the channel base. (10) Cooling water and chilled water piping shall be provided with block valves.

(11) The Contractor shall provide detailed calculation for chiller capacity and other technical particulars like foundation details/mounting etc. and they shall be subject to Employer's approval.

(12) The chiller system shall be provided with 100% redundant chilled water pumps with suction and discharge pressure gauges and temperature gauges; Chilled water circulation pump with 100% standby facility; Storage tank automatic water make up with manual by-pass facility, temperature indicator, level gauge and drain and overflow connection, in addition to any other instruments/equipments required for smooth, convenient operation of the system, which shall also be furnished by the Contractor.

(13). One set of redundant power supply (from different Units) with auto changeover facility mounted inside PDB shall be provided by Contractor for chiller.

2.10.00 The Steam and Water Analysis system shall be provided with the sample shut off valves, blow down valves, solenoid actuated valves, pressure reducer valves, safety relief valves, back pressure regulating valves, high pressure reducing valves etc. The requirements of the important valves are specified as under:

(1) The sample shut off valves (globe type), blow down valves and automatic pressure reducer valves (all conforming to ASTM B16.34) shall be suitable for at least 1.25 times of maximum operating pressure and temperature of sample line.

(2) The back pressure regulating valve shall be globe type and shall be suitable for a pressure range of 0-50psi. The back pressure regulating valve shall consist of a range spring and a diaphragm assembly. The back pressure of the regulating valve is adjusted to the required set point by the range spring. In case of any excess pressure the diaphragm shall be lifted to release the excess pressure to maintain back pressure equal to the set value. Stainless steel trim with linear flow characteristics shall be provided

Bidder shall submit the data sheet of these valves and these shall be subject to Employer's approval during detailed engineering stage.

2.11.00 Gauges

i) All temperature, pressure and level gauges are as per manufacturer's standard and proven practice.

ii) Each gauge shall have a dial engraving or separate phenolic name plate to identify the service. Service engravings, make, model, ranges and other technical features shall be subject to Employer's approval. Gauges shall be located on the front of sample conditioning panel.

iii) Accuracy of measurement shall be ± 1% of full scale or better.

2.12.00 Switches

i) Two (2) flow switches shall be provided, one on the primary cooling water outlet and one on the chilled water outlet. Accuracy/repeatability shall be ±2%. Make & model of flow switches shall be of Employer's approved one.

ii) Temperature switches shall be provided on the sample lines at primary sample outlet. All switches shall be repeatable within ±1.0% of full scale range.

2.13.00 Sample Patch Board

A quick disconnect patch board area shall be furnished on the SWAS panel. The patch board shall allow sample to be routed to any analyzer through quick disconnect valve at patch

board on the sample conditioning panel. The area shall consist of a patch board with bulk head tube fittings with double end shut-off and hose inserts. Body protector plugs shall be provided for each bulkhead tube fittings. Number of hose inserts, disconnect fittings etc. shall be as shown in SWAS Diagram and other specification documents.

The plugs shall be of type 316 SS construction. Sufficient length of 6mm ID, 9.5mm OD Tygon tubing shall be provided for complete spanning of the patch board area for interconnection of the bulkhead tube fittings. Each connection shall be provided with a Phenolic name plate engraved with a legend acceptable to the Employer.

2.14.00 Grab Samples

Grab sample valves on the front of SWAS panel shall be provided to direct grab samples to trough through grab sample nozzles or to the drain header. Approximately 300mm of flexible Tygon tubing shall be provided for each sample to allow grab sample collection and prevent splashing. Grab sample nozzles shall be provided with adapter and panel mounting flanges. All these items i.e. nozzles, adapter and flanges shall be of Employer approved make.

2.15.00 Sample Sink

A continuous sink, located at the place of grab sample analysis, shall be provided. The sink shall be of 316 stainless steel, 14 gage minimum. The sample sink shall be connected to waste drain header. Sample sink shall contain an integral stainless steel ledge to accommodate sample container. DM water connection shall be provided for cleaning of sample containers.

3.00.00 SPECIFICATION OF ANALYSERS

3.01.00 Field proven microprocessor based monitors/analyzers with LCD display and with necessary fault diagnostic features shall be employed. All analysers shall provide 4-20mA output signal capable of driving a load impedance of 500 Ohms minimum. The type, size, capacity, material, make, model and other specification details of the rest of the SWAS system like coolers, gauges/switches, sample pipes, filter, pressure reducing elements, grab sampling arrangement, valves & fittings, panels etc. shall be as decided during detailed engineering stage and shall be subject to Employer's approval. The power supply to all the analysers/ monitors shall be supplied by Contractor from his UPS system with all necessary switches, fuses, wiring/cabling and other required accessories etc. for distribution to individual requirements.

Minimum specifications of analysers

Requirements	**Conductivity**	**PH**	**Phosphate**	**Chloride**	**Turbidity**	**Degassed Cation Conductivity**
Type	For Hotwell, Two removable Type of Cells, For Others, Continuous Flow Through Type	Cell Flow Through sample pH analyser with Digital pH sensor. Digital pH sensor shall be suitably selected based on the conductivity range of respective process sample.	Colorimetric	Continuous Flow Through Type with Chloride & Sulphate Responsive Electrodes	Light reflection principle	Continuous Flow Through Type for continuous measurement of Specific conductivity, cation conductivity and degassed conductivity values

Accuracy	≤ ± 1%	≤ ± 1%	≤ ± 5% of reading	≤ ± 5%	≤ 2% for range 0-50 NTU, ≤ 5% for range 50 – 200 NTU	≤ ± 1% of Reading
Response Time (90 % of Full Scale)	≤ 5 sec.		≤ 16 min.		≤ 5 min.	≤ 5 sec.
Range*	0-1, 0-10, 0-100 micro-mho/cm (freely programmable) for Specific Conductivity . 0-1 micro-mho/cm log scale for Cation conductivity	6-11 pH freely programmable	0-10 ppm freely programmable	0-1000 ppb freely programmable	0 – 100, 0- 200 MTU, programmable	0-1, 0-10, 0-100 µS/cm,(freely program0mable)
Temperature Compensation	Automatic/	Automatic	Automatic	Automatic		Automatic
Sample Flow			50-150 ml/min			200ml/min (max)
No. of Streams	Single	Single	Single	Single	Single	Single
Analog output	4-20 mA output to DDCMIS	4-20 mA output to DDCMIS	4-20 mA output to DDCMIS	4-20 mA output to DDCMIS		Separate 4-20mA outputs for transmitting Specific conductivity, Cation conductivity and Degassed Cation Conductivity values to DDCMIS.

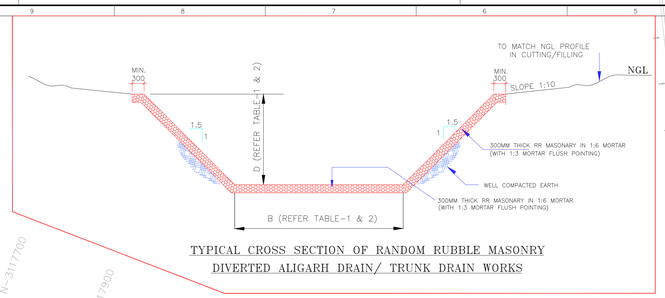
Minimum specifications of analysers …….continued

Requirements	**Hydrazine**	**Silica**	**Sodium**	**Dissolved O2**	**Total Iron (Fe)**
Type	Automatic Continuous Electrochemical Type	Continuous Colorimetric Type	Continuous Flow Through sample	Continuous Flow Through sample DO analyser with optical DO sensor	Continuous Flow Through sample
Accuracy	≤ ± 5%	≤ ± 5% of reading	≤ ± 10% of reading	≤ ± 5% of reading	<±5 % of reading or ±0.005 ppm

Response Time (90 % of Full Scale)	≤ 3 min.	≤ 15 min. (including sample switching)	≤ 4 min.	≤ 30 sec.	≤ 15 min. (including sample switching)
Stability	Calibration Once in a Month		Calibration Once in a Month		
Range*	0-50, 0-100 ppb freely programmable	0-50, 0-100 ,0-500 ppb freely programmable	0-1,0-10, 0-100 ppb freely programm-able	0-20,0-200 ppb freely programmable	0-50ppb, 0-150ppb, 0-300ppb, 0-1ppm, 0-5ppm freely programm-able or as per the process requirement.
No. of Streams	Single	Multi stream with sequencer/ stream selector (min. 4 streams)	Multi stream with sequencer/ stream selector (min. 4 streams)	Single	Multi stream with sequencer/ stream selector (min. 4streams)
Temperature Compensation	Automatic	Automatic	Automatic	Automatic	Automatic
Sample Flow	170 ml/min (max)	50-150 ml/min	125 ml/min (max)	170 ml/min (max)	200ml/min (max)
Analog output	4-20 mA output to DDCMIS	4-20 mA output to DDCMIS	4-20 mA output to DDCMIS	4-20 mA output to DDCMIS	4-20 mA output to DDCMIS
REMARKS	All the analysers/cells shall have open Corrosion resistant drain to waste header.				
	The material of flow cell for all analysers shall be SS316.				
	Analysers/ monitors/ cells shall be suitable for operating under the conditions specified. Cell life of the sensor shall be mentioned in the datasheet.				
	Dual cation exchange column shall be provided for cation conductivity.				
	For Hot well conductivity measurement, the Contractor shall provide direct insertion / withdrawal type conductivity cell whereas for all other samples it shall be flow-through type. Monitors for hot well conductivity shall be suitable for field mounting.				
	Sequencer shall following minimum features: a. Sequencer shall be able to identify the sample line and display the current sample line going to analyser with description/channel number. b. There shall be complete handshaking between Analyser and Sequencer. Sequencer shall be able to idendify non-availability of sample or choking etc. these conditions shall be alarmed to DDCMIS. There shall direct two way communication between Sequencer and DDCMIS for sample selection and bypassing of sample.				
	* The range selected for the analyser of all samples shall be as per process requirement and same shall be vetted by OEM/QSGM /QSTGM. Contractor to provide a document indicating selected ranges for each analyser.				

3.02.00 Contractor to furnish the open chemistry for all the analyser reagents being supplied under this package. Constitution of chemicals along with percentage of chemicals so that

	preparation / formulation can be done and checked at site LAB. Contractor to also provide the procedure for testing of reagents and shelf life of the chemicals. All the reagents shall be supplied as separate BBU items.
3.03.00	Contractor to provide piping arrangement in Wet Panel with remote operated (From Unit-DDCMIS) three way isolating valve (solenoid operated) for manual rinsing of all the Cation columns with DM water during non-availability of main sample and during shut down condition. Tapping for DM water shall be taken from discharge of Make-up water pump. Necessary piping, valves, instruments for monitoring of DM water flow shall be in the scope of contractor.
4.00.00	**SAMPLE PIPING SYSTEM**
4.01.00	This shall include piping, fittings, valves and accessories from tapping point upto wet panel located in SWAS room on as required basis. All sample piping from source tapping to primary rack and primary rack to wet panel shall be sized to maintain the sample velocity and flow rate required by analysers including grab sample and fouling factor requirement for that sample line. All the sample piping shall be of seamless type of material ASTM A312 316 H, conforming to ANSI B36.19. The pipe schedule number shall be suitable for the particular application/sample parameters. Contractor to provide calculation for sizing of sample lines during detail Engineering and certify that the same is adequate for the intended purpose.
4.02.00	Contractor to also provide automatic pressure reducer downstream of Primary coolers in each sample piping to ensure constant flow in each pipe in all regime of operation of Unit (from 0MW to rated MW).
4.03.00	All fittings from source tapping to thermal shut-off valve and automatic pressure reducer shall be socket welding type and of material ASTMA182 F316H conforming to ANSI B 16.11. Rest of the sample pipeline fitting after Pressure and temperature reduction shall as double compression type or socket weld type as per contractor standard proven practice.
4.04.00	Single and multi-pipes shall run with the minimum number of changes in direction. Suitable identification tags shall be provided for easy check up and for proper connections.
4.05.00	The valves to be used in sample piping shall be of stainless steel conforming to ASTM A182/312. The pressure temperature ratings shall be as per ANSI B16.34. The valve design shall be such that the seats can be reconditioned and stem and disc can be replaced without removing valve body from the line. The specification of End size, Pressure class, Type, End preparation, Body, etc. for different type of valves are specified in SWAS table in Clause No. 4.06.00 of Subsection IIIC-09, Section-VI, Part-B.
5.00.00	**Contract quantities** Refer Appendix- I to part A, Section VI of technical specifications.



TYPICAL CROSS SECTION OF RANDOM RUBBLE MASONRY DIVERTED ALIGARH DRAIN/ TRUNK DRAIN WORKS

TABLE-1 (DIVERSION ALIGARH DRAIN IN THE SCOPE OF SG PACKAGE)

DRAIN NO.	WIDTH B (IN M)		Z		DEPTH D (IN M)		START IL	END IL	START COORDINATES	END COORDINATES	APPROX. LENGTH	TYPE
	START	END	SIDE SLOPE		START	END						
DD-1	6	6	1.5:1		3	4	191.80	190.93	1944.53E 575.81N	991.19W 820.01N	3.2 KM	RRM

TABLE-2 (TRUNK DRAINS IN THE SCOPE OF SG PACKAGE)

DRAIN NO.	B	Z (H:V)	D	START COORDINATES	END COORDINATES	APPROX. LENGTH	TYPE
TD-1	2.0	1.5:1	2.4	1733.33E 220.41N	2016.36E 505.02N	500 M	RRM
TD-2	2.9	1.5:1	2.8	1470.56E 276.54N	531.43E 147.32S	2100 M	RRM
TD-3	3.0	1.5:1	2.8	531.43E 147.32S	191.65W 573.56S	850 M	RRM
TD-4	3.0	1.5:1	3.0	191.65W 573.56S	660.60W 217.52S	990 M	RRM
TD-5	4.0	1.5:1	3.0	660.60W 217.52S	959.10W 959.10N	685 M	RRM
TD-6	0.5	RECTANGULAR	1.2	769.98E 996.13N	1101.98E 1002.00N	332 M	RCC
TD-7	0.5	RECTANGULAR	1.1	769.98E 996.13N	104.11E 981.75N	666 M	RCC
TD-8	1.0	RECTANGULAR	1.4	219.22W 975.01N	104.11E 981.75N	325 M	RCC
TD-9	1.0	RECTANGULAR	1.6	219.22W 975.01N	791.43W 967.16N	575 M	RCC

B-BED WIDTH (m)
Z-SIDE SLOPE (H:V)
D-DEPTH WITH FREE BOARD (m)
RRM-RANDOM RUBBLE MASONRY
RCC-REINFORCED CEMENT CONCRETE

SPL. NOTE-1:-

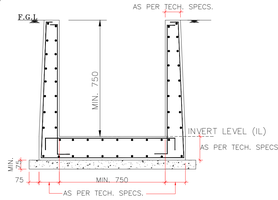
THE ABOVE TABLES (TABLE-1 & TABLE-2) IS MINIMUM & NOT EXHAUSTIVE. THESE INDICATE ALIGARH DIVERTED DRAIN & TRUNK DRAINS ONLY. CATCH DRAINS ARE NOT TABULATED & INDICATED IN LAYOUT, WHICH ARE ALSO IN BIDDER'S SCOPE.

TABLE-3 (CULVERTS CROSSING NH-91 IN THE SCOPE OF SG PACKAGE)

CULVERT NO.	PURPOSE	SIZE (MIN. CLEAR WIDTH X DEPTH)	TYPE	MIN. CLEAR WIDTH & DEPTH SECTION	PLACE/REMARKS
CV-1	PLANT DRAINAGE	1 NO. CELL OF SIZE 1M X 1.7M	RCC BOX PUSHING	1M / 1.7M	UNDER EXISTING NH-91
CV-2	PLANT DRAINAGE	1 NO. CELL OF SIZE 1M X 1.7M	RCC BOX PUSHING	1M / 1.7M	UNDER EXISTING NH-91
CV-3	PLANT DRAINAGE	1 NO. CELL OF SIZE 2M X 1.8M	RCC BOX PUSHING	2M / 1.8M	UNDER EXISTING NH-91

SPL. NOTE-2:-

THE LIST OF CULVERTS AS INDICATED ABOVE (TABLE-3) ARE BY BOX PUSHING METHOD UNDER EXISTING NH-91. ALL OTHER CULVERTS FOR CATCH DRAINS/TRUNK DRAINS/ DIVERTED ALIGARH DRAIN ARE NOT TABULATED BUT ARE ALSO IN THE SCOPE OF SG PACKAGE IN ORDER TO MEET THE FUNCTIONAL REQUIREMENT.



TYP. CROSS SECTION OF RCC CAST IN-SITU TRUNK/CATCH DRAINS

LEGEND:-

1. CATCH DRAINS IN SG PACKAGE SCOPE (IN RCC)
2. TRUNK DRAINS IN SG PACKAGE SCOPE (IN RR MASONRY)
3. DIVERTED ALIGARH DRAIN IN SG PACKAGE SCOPE (IN RR MASONRY)
4. CULVERT FOR CATCH/TRUNK DRAIN/ DIVERTED ALIGARH DRAIN IN SG PACKAGE SCOPE. (IN RCC BOX)
5. CULVERT UNDER EXISTING NH-91 (BY BOX/PIPE PUSHING METHOD.) IN SG PACKAGE SCOPE.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
2. THE DESIGN (INVERT LEVELS, DEPTH, WIDTH, THICKNESS ETC.) OF DRAINS SHALL BE CARRIED OUT AS PER TECHNICAL SPECIFICATION AND CONTRACT TERMS & CONDITIONS. HOWEVER, MINIMUM DIMENSIONS SHALL BE MAINTAINED BY THE CONTRACTOR AS SPECIFIED IN THIS DRAWING.
3. REINFORCED CEMENT CONCRETE (RCC) SHALL BE OF GRADE M25 FOR DRAINS AND CULVERTS AS PER IS: 456-2000.
4. MINIMUM CLEAR COVER TO MAIN REINFORCEMENT OF TOP SLAB, WALL AND BASE SLAB SHALL BE 40 MM.
5. ALL CIVIL AND STRUCTURAL WORKS SHALL BE CARRIED OUT IN CONJUNCTION WITH THE CONTRACT TERMS AND CONDITIONS AND TECHNICAL SPECIFICATION.
6. PCC BELOW FOUNDATIONS SHALL BE LAID IMMEDIATELY AFTER EXCAVATIONS. IN CASE OF ANY LOOSE MATERIAL BELOW FOUNDING LEVEL THE SAME SHALL BE REMOVED AND FILLED BY PCC. WATER TABLE SHALL BE MAINTAINED AT 0.5M BELOW FOUNDING LEVEL.
7. REINFORCEMENT STEEL SHALL BE HIGH YIELD DEFORMED TMT BARS OF GRADE FE-500 CONFIRMING TO IS:1786 (LATEST)
8. WEEP HOLES AT EVERY ONE METRE DISTANCE SHAL BE PROVIDED FOR DEPTH OF DRAIN MORE THAN 1M.
9. SLOPE OF THE DRAIN SHALL BE 1 VERTICAL : 1000 HORIZONTAL UNLESS OTHERWISE NOTED. DIRECTION OF SLOPE AS SHOWN IS SUGGESTIVE ONLY AND SHALL BE SUITABLY DECIDED AT DETAILED ENGG. STAGE IN CONSULTATION WITH THE OWNER.
10. DRAINS ARE TO BE PROVIDED ON BOTH SIDES OF THE ROAD AND CULVERTS SHALL BE PROVIDED AT REQUIRED LOCATIONS.
11. THE DRAIN LAYOUT AND DETAILS AS SHOWN IN THIS DRAWING ARE WITH REFERENCE TO "HYDROGRAPHICAL AREA DRAINAGE STUDY" REPORT. HOWEVER, ALL DRAINS & DETAILS AS SHOWN THIS DRAWING ARE IN THE SCOPE OF BIDDER.
12. ADDITIONAL DRAINS/CULEVRTS NOT SHOWN IN THE DRAWING BUT REQUIRED TO MEET THE FUNCTIONAL REQUIREMENT SHALL ALSO BE PROVIDED BY THE BIDDER.

REFERENCE DRAWINGS/DOCUMENTS:-

1. 'GENERAL LAYOUT PLAN' DRAWING
2. 'LAYOUT OF ROAD' DRAWING
3. 'SITE LEVELLING PLAN' DRAWING
4. 'HYDROGRAPHICAL AREA DRAINAGE STUDY' REPORT

FOR INFORMATION PURPOSE ONLY

SCALE 40 0 40 80 120 160M

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
B	FOR INFORMATION PURPOSE ONLY										28.02.19
A	FOR INFORMATION PURPOSE ONLY										23.08.18

CLEARED BY

OWNER: THDC INDIA LIMITED (A JV of GOVT. OF INDIA & GOVT. OF UP)

CONSULTANT: NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION

PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW)

TITLE: TG ISLAND PACKAGE LAYOUT OF DRAINS

SIZE	SCALE	DRG. NO.	REV. NO.
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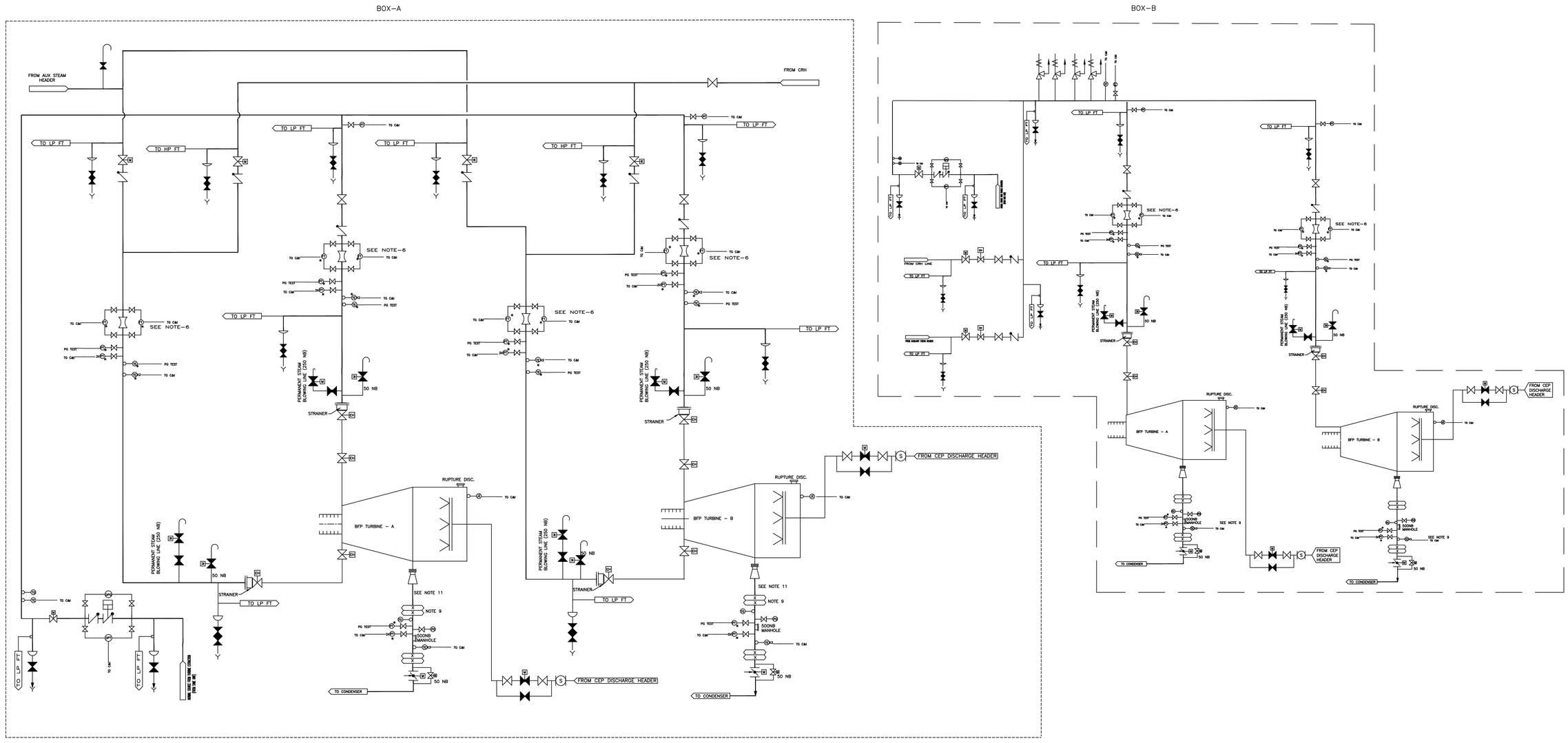

NOTE:

1. TWO TYPE OF ARRANGEMENT HAS BEEN SHOWN IN BOX-A AND B FOR EXTRACTION STEAM SYSTEM TO BFPT. BOTH OF THE ARRANGEMENTS ARE ACCEPTABLE IF IT IS THE STANDARD AND PROVEN PRACTICE OF THE BIDDER.
2. PIPING AND EQUIPMENT DRAINS SHOWN ARE INDICATIVE REQUIREMENT SHALL BE FINALISED BASED ON PROCESS/LAYOUT AS WELL AS ASME TDP REQUIREMENTS.
3. ALSO REFER DRG: MAIN STEAM,HOT REHEAT AND COLD REHEAT P&ID
4. IN CASE RELIEF DIAPHRAGM IS PROVIDED ON EXHAUST PIPE, THEN THE VENT PIPING INCLUDING HANGERS, SUPPORTS TO VENT THE STEAM RELEASED DUE TO RUPTURE OF RELIEF DIAPHRAGM SHALL BE LED SUITABLY OUTSIDE THE TURBINE HALL BY THE BIDDER.
5. PROPER TURBINE DRIVE GLAND SEALING ARRANGEMENT COMPLETE WITHVALVES, PIPING, FITTINGS ETC. SHALL BE PROVIDED BY BIDDER EITHER FROM MAIN TG GLAND SEALING HEADER OR ANY STEAM HEADER AS PER THEIR STANDARD PRACTICE
6. IN CASE OF SINGLE ADMISSION BFP TURBINE, A SINGLE FLOW MEASURING ELEMENT MAY BE PROVIDED FOR MEASURING STEAM FLOW.
7. AT ALL EQUIPMENT/VALVES/SPECIALITIES TO PIPING INTERFACE POINTS MATCHING COUNTER FLANGES, WHEREVER REQUIRED, SHALL BE PROVIDED BY THE EQUIPMENT/ VALVES/SPECIALITIES SUPPLIER.
8. BIDDER SHALL PROVIDE STUBS & TAPPING FOR PG TEST OF EQUIPMENT/SYSTEM UNDER HIS SCOPE OF SUPPLY AND FOR SAMPLING WHEREVER REQUIRED.
9. NO. AND LOCATION OF METALLIC EXPANSION JOINTS SHALL BE BASED ON STRESS ANALYSIS.
10. FOR DETAILS OF IMPULSE/ROOT VALVES ETC. REFER C&I INSTALLATION/SOURCE CONNECTION DRAWING NOs: 0000-999-POI-A-022 TO 0000-999-POI-A-035 FOR SG ISLAND PACKAGE AND DRAWING NOs : 0000-110-POI-A-022 TO 0000-110-POI-A-035 FOR STG ISLAND PACKAGE.
11. THE BIDDER MAY OFFER SEPARATE CONDENSER FOR EACH BFP DRIVE TURBINE, IN WHICH CASE, THE ITEMS SHOWN ON THE EXHAUST LINE WILL NOT BE APPLICABLE.
12. FOR KKS CODES, REFER DRWG. NO 0000-110-POI-G-001
13. VENTURI TYPE OF FLOW EEMENT IS SHOWN HERE, HOWEVER ,BIDDER MAY OFFER NOZZLE TYPE OF FLOW ELEMENT BASED ON HIS STANDARD PRATICE OR AS PER THE RANGE OF REYNOLDS NO AS MENTIONED IN ISO-5167.
14. BOP-C&I MAY BE READ AS BOP-C&I-TG.
15. THE SPECIFICATION OF INSTRUMENTS WITH * MARK SHALL BE IDENTICAL (I.E. SAME ACCURACY) AND ACCURACY LEVEL OF THESE INSTRUMENTS SHALL CONFORM TO ASME PTC REQUIREMENTS FOR PG TEST. IT SHALL BE ENSURED THAT ALL THESE INSTRUMENTS ARE NECESSARILY SUPPLIED AND ERECTED AT THE SAME TIME SO AS TO FACILITATE CONDUCTANCE OF PG TEST DURING INITIAL OPERATION.
16. INSTRUMENTS WHICH ARE SHOWN AS CONNECTED TO PG TEST SHALL BE USED FOR PG TEST AND SHALL BE PERMANENTLY INSTALLED IN THE PIPING AND KEPT WIRED UP TO THE PG TEST DATA LOGGER/ PG TEST CALCULATION SERVER (INDICATED IN FUNCTIONAL GUARANTEES AND LIQUIDATED DAMAGES) EVEN AFTER CONDUCTANCE OF THE PG TEST & SHALL BE THE PROPERTY OF NTPC.INSTRUMENTS SHOWN FOR PG TEST ARE MINIMUM IN NUMBER. IN CASE ADDITIONAL INSTRUMENTS OVER AND ABOVE THOSE INDICATED HERE AS CONNECTED TO PG TEST ARE REQUIRED BY CONTRACTOR FOR CONDUCTANCE OF PG TEST, THEN THE SAME SHALL BE SUPPLIED WITHIN THIS CONTRACT WITH SPECIFICATION CONFORMING TO ASME PTC REQUIREMENTS.

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.			APPD.	DATE
A	RELEASED FOR TENDER	AS	HAS	HAS	M	C&I	AKK	22/02/19
					CLEARED BY			

FOR TENDER PURPOSE ONLY

OWNER: THDC INDIA LIMITED
(A JOINT VENTURE OF GOVT. OF INDIA & GOVT. OF UP)

CONSULTANT: NTPC Ltd.
(A Government of India Enterprise)
ENGINEERING DIVISION

PROJECT: KHURJA SUPER THERMAL POWER PROJECT (STAGE-I)
(2X660 MW)

TITLE: EXTRACTION STEAM P&ID FOR BFP TURBINE

SIZE	SCALE	DRG NO.	REV. NO.
A-1	NTS	9915-999-POM-A-008	C

THDC INDIA LIMITED

(A Joint Venture of Govt. of India & Govt. of U.P.)
Pragati Bhawan, Pragatipuram, Bypass Road, Rishikesh
UTTARAKHAND, INDIA

Amendment No.15

dated 26th Mar'2019
to

Turbine Generator and Associated Packages for Khurja Super Thermal Power Project (2x660 MW)

AMENDMENT NO. THDC/RKSH/CC-9915-371-AMDT-15

Tender No. THDC/RKSH/CC-9915-371

Amendment No. 15 to Bidding Documents [Commercial (Section I, II, III, IV, V & VII)]

Sl. No.	Ref. Clause	Existing Provisions	Amended provisions
1.	Item No. 4.2, Section-III (BDS)	The reference plants whose details have been declared as per the specified format in the relevant attachment [i.e. Attachment No.-3A] shall only be considered to ascertain the bidder's compliance to the specified Qualifying Requirement (QR). Bidders wishing to provide additional reference plants are required to declare the same in similar format which shall be additionally attached. However, bidders are not permitted to quote more than three times of the reference works/plants wherever specified in the Qualifying Requirements for this purpose. Bidders are required to furnish the details of past experience based on which selection is to be made as per format enclosed in the bidding documents and enclose relevant documents like copies of authentic work order, completion certificate, agreements etc. supporting the details/data provided in the format. No claims without supporting documents shall be accepted in this regard. The Employer at its discretion may seek any clarification and/or documentary evidence only for the reference plants as mentioned above. However, no change or substitution of the reference plants as new/additional plant for conforming to the specified Qualifying Requirement shall be sought, offered or permitted.	The reference plants whose details have been declared as per the specified format in the relevant attachment [i.e. Attachment No.-3A] shall only be considered to ascertain the bidder's compliance to the specified Qualifying Requirement (QR). Bidders wishing to provide additional reference plants are required to declare the same in similar format which shall be additionally attached. However, bidders are not permitted to quote more than three times of the reference works/plants wherever specified in the Qualifying Requirements for this purpose. Bidders are required to furnish the details of past experience based on which selection is to be made as per format enclosed in the bidding documents and enclose relevant documents like copies of authentic work order, completion certificate, agreements etc. supporting the details/data provided in the format. No claims without supporting documents shall be accepted in this regard. ***However, if any of the reference work pertains to the Contract(s)/Works executed by Bidder for NTPC in the past then in respect of such Contract(s)/Works Bidder shall not be required to enclose Client Certificate(s) alongwith its bid.*** The Employer at its discretion may seek any clarification and/or documentary evidence only for the reference plants as mentioned above. However, no change or substitution of the reference plants as new/additional plant for conforming to the specified Qualifying Requirement shall be sought, offered or permitted.

AMENDMENT NO.16 TO BIDDING DOCUMENTS (TECHNICAL SPECIFICATION)

SL. NO.	SPECIFICATION REFERENCE				Existing	Read as
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
1	VI/ B	A-02	1	1.01.02 (c)	Face of the buildings and facilities shall be located in such a way so as to have an offset of minimum 20 m with respect to centre line of double lane road and 15 meter with respect to centre line of single lane road. The spacing between various buildings and facilities shall be suitably decided so as to avoid interference between the foundations.	Face of the buildings and facilities shall be located in such a way so as to have an offset of minimum **15 m** with respect to centre line of double lane road and **12 m** with respect to centre line of single lane road. The spacing between various buildings and facilities shall be suitably decided so as to avoid interference between the foundations.
2	VI/B	A-2	5 OF 12	1.02.00.3	'Following clear Height shall be considered while developing the layout of HT/LT Switchgear Room and Boiler MCC room. i) With Bus Duct – 4.5 m (min) ii) Without Bus Duct – 4.0 m (min)	'Following Height shall be considered while developing the layout of HT/LT Switchgear Room and Boiler MCC room. i) With Bus Duct – 4.5 m (min) ii) Without Bus Duct – 4.0 m (min)

Amendment No. 19 to Bidding Documents [Commercial (Section I, II, III, IV, V & VII)]

<table>
<tr><th>Sl. No.</th><th>Ref. Clause</th><th>Existing Provisions</th><th>Amended provisions</th></tr>
<tr><td>1.</td><td>Clause 8.2.2.1 (viii), Section-II (ITB)</td><td>Attachment 10 (P) :– Deleted</td><td>Attachment 10(P) :– Declaration on Local Content

Declaration regarding local content as per the Employer’s format, for granting of purchase preference.

In case a bidder does not submit the aforesaid declaration or no value is indicated by the bidder or statement/any declaration like ‘later’, ‘to be furnished later’, ‘NA’ etc. are indicated by the bidder, then the bidder shall not be considered as a local supplier and shall not be eligible for any purchase preference. No further claim in this regard shall be entertained by the Employer.</td></tr>
<tr><td>2.</td><td>Clause 8.2.2.1 (xii), Section-II (ITB)</td><td>New clause</td><td>Attachment 9 (Rev.01): Erection Tools and Plant and Safety Equipments & Safety Personal Protective Equipments

List of Erection Tools and Plant and Safety Equipments & Safety Personal Protective Equipments which the bidder proposes to bring to site in case the contract is awarded to him.</td></tr>
<tr><td>3.</td><td>ITB Clause no. 30.1</td><td>Subject to ITB Clause 31, the Employer will award the contract to the successful Bidder whose bid has been determined to be substantially responsive and to be the lowest evaluated bid, further provided that the Bidder is determined to be qualified to perform the contract satisfactorily.</td><td>Subject to ITB Clause 31 (Employer’s Right to Accept any Bid and to Reject any or all bids), the Employer will award the Contract to the Bidder, whose bid has been determined to be substantially responsive to the Bidding Documents and provided that such bidder has been determined to be qualified to perform the contract satisfactorily, as per methodology indicated in Annexure-II to BDS.</td></tr>
<tr><td>4.</td><td>Item No. 9.1, Sl. No. 3.0, BDS (Section-III)</td><td>3.0 THDC Inputs:
<table><tr><th rowspan="2">Sl. No.</th><th rowspan="2">Input</th><th colspan="2">Schedule (Month from NOA)</th></tr><tr><th>Unit #1</th><th>Unit #2</th></tr></table></td><td>3.0 THDC Inputs:
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<tr>
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<tr><td>2.</td><td>Construction Power*</td><td colspan="2">First Month at one point to feed ring main to be constructed by Bidder*</td></tr>
<tr><td>3.</td><td>Availability of Steam for Steam Blowing & subsequently Turbine rolling</td><td>40</td><td>46</td></tr>
</table>
* Advance action is to be taken by bidder so that Ring main works start matching with construction activities. It is intended to provide power by THDC at one point of suitable capacity. However, Bidder to deploy sufficient DG sets for piling/ foundations, batching plant, fabrication, erection and Construction activities to meet the construction schedule.
</td>
<td>
<table>
<tr><td>4.</td><td>Land for site office of agency</td><td colspan="2">3</td></tr>
<tr><td>5.</td><td>Construction Power*</td><td colspan="2">*Eightmonth at one point from owner’s ring main.</td></tr>
<tr><td>6.</td><td>Availability of Steam for Steam Blowing & subsequently Turbine rolling</td><td>40</td><td>46</td></tr>
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</td>
</tr>
<tr>
<td>5.</td>
<td>Sl. No. 3.0, Attachment-14, Section-VII, Part 1 of 3</td>
<td>
3.0 THDC Inputs:
<table>
<tr><th>Sl. No.</th><th>Input</th><th colspan="2">Schedule (Month from NOA)</th></tr>
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<tr><td>6.</td><td>Sl. No. 3.0, Appendix-4, Section-VII, Part 3 of 3</td><td>3.0 THDC Inputs:
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<tr><td>7.</td><td>BID FORM STAGE-II (PRICE) BID Section-VII, Book 2 of 3</td><td>Existing Bid Form Stage-II (Price) Bid</td><td>Replace the existing Bid Form Stage-II (Price) Bid with the revised Bid Form Stage-II (Price) Bid (Rev.01) which is enclosed herewith.</td></tr>
<tr><td>8.</td><td>Clause 55 (GCC cl. 6.5), Section-V (SCC)</td><td>GCC Clause 6.5</td><td>GCC clause 6.5 stands deleted.</td></tr>
</table>

9.	**Clause 39, Section-V (SCC)**	-	SCC clause 39 stands deleted.
10.	**Clause 62 (GCC clause30), Section-V (SCC)**	New clause	**62. Replace existing GCC 'Clause 30: Limitation of Liability' with the following:** 30.1 Except in cases of criminal negligence or willful misconduct, (a) neither Party shall be liable to the other Party, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, which may be suffered by the other Party in connection with the Contract, provided that this exclusion shall not apply to any obligation of the Contractor to pay liquidated damages to the Employer and (b) the aggregate liability of the Contractor to the Employer, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to any obligation of the Contractor to indemnify the Employer with respect to patent infringement. (c) the aggregate liability of the Employer to the Contractor except for GCC sub-clause 29.3, whether under the Contract, in tort or otherwise, at any point of time during the execution/performance of the Contract, shall not exceed the 'total Contract Price less payments already released to the Contractor'.

11.	**Clause 63 (GCC clause 47), Section-V (SCC)**	New GCC Clause	**Clause no. 47 No Claim for interest or damage** 47.1 **Interest on money due to the contractor**: No omission on the part of the Engineer-in-Charge to pay the amount due upon measurement or otherwise shall vitiate or make void the contract, nor shall the contractor be entitled to interest upon any guarantee or payments in arrears nor upon any balance which may on the final settlement of his account, be due to him. 47.2 **No claim for interest or damage:** No claim for interest or damage will be entertained or be payable by the Corporation in respect of any amount or balances which may be lying with the Corporation owing to any dispute, difference or misunderstanding between the parties or in respect of any delay or omission on the part of the Engineer--in-Charge in making intermediate or final payments or in any other respect whatsoever.
12.	**Price Schedules, Section-VII, Part 2 of 3**	Existing Price Schedules	Replace the existing Price Schedules with the revised Price Schedules which are enclosed.

TURBINE GENERATOR AND ASSOCIATED PACKAGES
FOR
KHURJA SUPER THERMAL POWER PROJECT (2 X 660 MW)
BIDDING DOCUMENT NO. : THDC/RKSH/CC- 9915-371

(DECLARATION ON LOCAL CONTENT)

Bidder's Name and Address :

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

We have read the provisions of "Preference to Make In India and granting of purchase preference to local suppliers" enclosed with the Bid Data Sheets. In terms of the requirement of the aforesaid provisions, we hereby declare the following:

1.0 In order to avail purchase preference, we confirm that we are a Local Supplier, and the local content included in the package is ……% of our total bid price for complete scope of work for **Turbine Generator And Associated Packages** for Khurja Super Thermal Power Project (2x660 MW) as per details given below.

Sl. No.	Description of Goods & Services	Quantity/ Weight	Value of Local Goods & Services	% of Total bid Price	Details of the location(s) at which the local value addition is made

A certificate from the statutory auditor or cost auditor(in the case the bidder is a company)orfromapracticingcostaccountantorpracticingcharteredaccountant.

(in respect of bidders otherthancompanies) givingthepercentage oflocalcontent has been placed at Annexure-1 to this Attachment.

2.0 **Further, we hereby confirm the following:**

Whether the bidder is presently debarred / banned by any other procuring entity for violation of 'Public Procurement (Preference to Make In India), Order 2017' (PPP-MII Order) dated 15.06.2017 issued by Department of Industrial Policy and Promotion (DIPP)	**Yes* / No***

*** Strike off, whichever is not applicable**

3.0 We agree to furnish any information as a proof of the above to your satisfaction as and when required.

Note : 1) Continuation sheets of like size and format, may be used as per Bidder's requirement and shall be annexed to this Attachment.

2) Certificate pertaining to percentage of local content from statutory auditor or cost auditor / practicing chartered accountant or cost accountant is to be furnished in cases where the total bid price is more than INR 10 Crores.

TURBINE GENERATOR AND ASSOCIATED PACKAGES
FOR
KHURJA SUPER THERMAL POWER PROJECT (2 X 660 MW)
BIDDING DOCUMENT NO. : THDC/RKSH/CC- 9915-371
(Schedule of Construction and Erection Tools & Tackles)

Bidder's Name and Address :

To
Corporate Contracts,
THDC India Ltd.,
Pragati Bhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Dear Sirs,

I. ERECTION TOOLS & EQUIPMENTS

We indicate herein below the minimum T & P we have in our/our associate's/subvendor's possession and the equipment we propose to bring to the Site required for entire **Turbine Generator and Associated Packages**, in case the contract is awarded to us.

Sl. No.	Type and Description of the Equipment	Quantityof Suggestive major T&Pto be deployed	Number the Bidder has in posse-ssion	Number the Bidder proposes to bring to the Site
(1)	(2)	(3)	(4)	(5)

We hereby confirm that the quantity and type of Certain tools and equipment, we will deploy for construction/erection, will not be less than those listed above (Col-5) and agree to bring more equipment, if so warranted, in the opinion of the Project Manager. Our proposed construction/erection equipment utilisation plan indicating utilisation dates and time duration of all major erection and construction equipment placed on site, is enclosed at Annexure..... to this Attachment-9.

We have enclosed construction and erection philosophy including sequence of erection and construction, implementation methodology, deployment schedule of tools and plant to be brought to site for construction/ erection work under the subject package with Attachment-14 of Our Techno-Commercial Bid, linked with major milestone and intermediate milestone forTurbine Generator and Associated Packages. We have also enclosed network showing inter-linkage between major milestones, tool and plants deployed and sequential supply of material for the subject package.

Note: Bidder's attention is drawn to the provision of BDS regarding deployment of T&Ps as per suggestive list of T&Ps for STG and Civil Works enclosed at Annexure-A & B to BDS, Section-III to Bidding Documents.

II. Safety Equipments& Safety Personal Protective Equipments

The list of minimum suggestive Safety Equipments& Safety Personal Protective Equipments to be deployed necessarily by the bidder is furnished below. However, the actual deployment at site shall not be limited to these and additional equipments if required shall be mobilised by the Contractor.

S No	Minimum Suggested List of Safety Equipments and Safety Personal Protective Equipments	Minimum Nos. required
1	Safety Net (Net Size: 10m x 5m, Mesh Size: 25 mm, Mesh Rope: 2mm double cord, Border/Tie Cord: 12mm diameter polypropylene rope (tested as per IS: 5175).Two metres length shall be provided at all four corners.	70
2	**Fall Arrester 'Rope grab fall arrester' & anchorage line.** Anchorage Line: 14mm-16 mm diameter, three strand twisted Polyamide rope. Rope Grab fall arrester: Openable & Guided type Fall Arrestor (on flexible line) conforming EN 353-2 & works on 14-16 mm diameter polyamide rope. material: Nickel Chrome plated Steel Connector: Karbiner conforming to EN 362 (Minimum Strength 22 kN), material: Steel	50 nos. of Rope Grab Fall arrester' and Karbiner each. 10 nos. anchorage line, 30 meter long each, 30 nos. anchorage line, 40 meter long each.
3	**Horizontal life line** Stainless Steel Wire rope of 8mm diameter. Minimum six nos. of steel U-bolt clips are required for clamping each wire rope to a rigid support (03 nos. of U-bolt clips at each end).	50 nos. of wire rope, each 25 meter long.
4	**Ladders on column** The minimum design live load on metallic ladder shall be a single concentrated load of 100 kilo grams. All rungs shall have a minimum diameter of 1.90 centimeters, and minimum clear length of rungs shall be 40.6 centimeters. The distance between rungs shall not exceed 30.5 centimeters. Each ladder shall have maximum height of 9.0 metre. The ladder shall have proper fastenings for attaching it to a column using positive means such as bolt, weld or other type of fasteners.	cumulative length of ladders is 300 meters
5	**Safety PPEs (Industrial Safety helmet & Industrial Safety Shoes)** Industrial Safety Helmet (IS:2925-1984 marked). Industrial Safety Shoes (IS:15298-2002 marked).	525 nos. each

Note:

1. Safety PPEs include Industrial Safety Helmet and Industrial Safety Shoes.

Date :
Place :

(Signature) .....
(Printed Name) .....
(Designation) .....
(Common Seal) .....

Sub: Preference to Make In India and granting of purchase preference to local suppliers- regarding

It is the policy of the Government of India to encourage 'Make in India' and promote manufacturing and production of Goods and Services in India with a view to enhancing income and employment. In this regard, the following guidelines, concerning the procedure to be adopted for granting purchase preference to local suppliers, are hereby issued:

1.0 Definitions:

a) **'Local content'** means the amount of value added in India which shall be the total value of the goods and services procured (excluding net domestic indirect taxes) minus the value of imported content in the goods and services (including all customs duties) as a proportion of the total value, in percent.

b) **'Local supplier'** means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed.

c) **'L1'** means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

d) **'Margin of purchase preference'** means the maximum extent to which the evaluated bid price of a local supplier may be above the L1 for the purpose of purchase preference.

e) **'Nodal Ministry'** means the Ministry or Department identified in respect of a particular item of goods or services or works

2.0 Minimum local content

2.1 The minimum local content shall be 60%.

3.0 Margin of Purchase Preference

3.1 The margin of purchase preference shall be 20%.

4.0 Requirement of Purchase Preference:

4.1 Purchase preference shall be given to local suppliers as specified here under:

The following procedure shall be followed:

i) Among all qualified and substantially responsive bids, the lowest evaluated bid will be termed as L1. If L1 bid is from a local supplier, the contract will be awarded to L1.

ii) If L1 bid is not from a local supplier, the lowest evaluated bidder among the local suppliers, will be invited to match the lowest evaluated bid (L1) price subject to local supplier's evaluated bid price falling within the margin of purchase preference and the contract shall be awarded to such local supplier subject to matching the lowest evaluated bid (L1) price.

iii) In case such lowest eligible local supplier fails to match the lowest evaluated bid (L1) price, the local supplier with the next higher evaluated bid within the margin of purchase preference shall be invited to match the lowest evaluated bid (L1) price and so on and contract shall be awarded accordingly. In case none of the local suppliers within the margin of purchase preference matches the lowest evaluated bid (L1) price, then the contract may be awarded to the L1 bidder.

iv) For the purpose of matching of lowest evaluated bid (L1) price, the local supplier would have to necessarily reduce all components of the quoted price on pro-rata basis. The reduction should not apply on the evaluation loading on account of functional guarantees and other loadings (if any, which are not dependent on quoted price). The summation of the revised / reduced quoted price and the evaluation loading on account of functional guarantees and other loadings (if any) shall be equal to the lowest evaluated bid (L1) price.

5.0 Verification of Local Content:

5.1 The local supplier shall be required to provide, in the relevant Attachment of Price Bid, self-certification / declaration that the Item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made as per relevant Attachment of Price Bid.

5.2 In cases the total bid price of the supplier / bidder is in excess of INR 10 crore, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

5.3 False declarations will be dealt in line with the provisions of the Bidding documents pertaining to **Corrupt or Fraudulent Practices**.

5.4 A supplier who has been debarred / banned by any other procuring entity for violation of 'Public Procurement (Preference to Make In India), Order 2017' (PPP-MII Order) dated 15.06.2017 and its subsequent revisions / amendments issued by Department of Industrial Policy and Promotion (DIPP) shall not be eligible for preference under the aforesaid procedures forduration of the

debarment. The local supplier shall be required to furnish a confirmation in this regard in the relevant Attachment of Price Bid.

6.0 Local Sourcing

The Bidder / Contractor are requested to encourage and promote domestic manufacturing and production of goods and services by sourcing goods and services applicable under the contract / package from domestic suppliers / service providers. In this regard, Bidder shall also follow guidelines / advisory issued by Government of India from time to time, to the extent applicable to them, regarding promotion of local sourcing of goods including Bought out Items and services.

BID FORM STAGE-II (PRICE) BID

Proposal Ref. No.....
Date : .....

IFB No:

Bid Doc. No. : THDC/RKSH/CC-9915-371

Name of Package : **TURBINE GENERATOR AND ASSOCIATED PACKAGES FOR KHURJA SUPER THERMAL POWER PROJECT (2X660 MW) BIDDING DOCUMENT NO. THDC/RKSH/CC-9915-371**

To
Corporate Contracts,
THDC India Ltd.,
PragatiBhawan, By-Pass Road,
Pragatipuram, Rishikesh - 249 201

Gentlemen and/or Ladies,

1.0 Having examined the **Bidding Documents No. THDC/RKSH/CC-9915-371,** including subsequent amendments and clarifications if any, the receipt of which is hereby acknowledged, we the undersigned, offer to design, manufacture, test, deliver, construct, install and commission (including carrying out Guarantee Test) the facilities under the above-named Contract in full conformity with the said Bidding Documents for the sum **(excluding taxes & duties indicated by us in Schedule-7 & 7A)** as mentioned in Bid invitation at www.eprocure.gov.in site or such other sums as may be determined in accordance with the terms and conditions of the Contract.

2.0 **ATTACHMENTS TO THE BID FORM STAGE-II (PRICE) BID:**

2.1 In line with the requirements of the Bidding Documents, we enclose herewith the following Attachments & Price Schedules, duly filled-in as per your proforma:

(a) Attachment 1(P) : Extension of Bid Security in the form of

..... (Please fill in the alternative chosen) for a sum of ..... (Name of currency and amount in words & figures) valid for a period of 225 days from the date set for opening of Stage-II (Price) bids. As required, the Attachment-1(P) (i.e. Bid Security) has been furnished in physical form in a **separate sealed envelope.**

(b)	Attachment 2(P) :	A power of attorney duly notarized by a Notary Public indicating that the person(s) signing the bid have the authority to sign the bid and thus that the bid (price bid) is binding upon us during the full period of its validity in accordance with the ITB Clause No.13. As required, the Attachment-2(P) (i.e. Power attorney) has been furnished in physical form in a separate sealed envelope.
(c)	Attachment-3(P)	Certificate of Compliance to all provisions of Bid Documents.
(d)	Attachment-4(P)	Declaration regarding Import Content as per your format enclosed in the Bidding Documents.
(e)	Attachment-4A(P)	The declaration regarding Custom duty benefits for import of Construction Equipment considered in the Bid.
(e1)	Attachment-4(P1)	**DELETED**
(f)	Attachment-5(P)	**DELETED**
(h)	Attachment-6(P)	**DELETED**
(i)	Attachment-7(P)	Details of equipment and mandatory spares to be imported from Associate/Collaborator by the Manufacturer or the bidder indicating value of items.
(j)	Attachment-8(P)	Details of our Local Representation including remuneration amount**.**
(k)	Attachment-9(P)	Price Adjustment Data.
(l)	***Attachment-10 (P)***	***Declaration regarding local content as per the Employer's format, for granting of purchase preference.***

(m)	***Attachment 9 (Rev.01):***	***List of Construction and Erection Tools & plants and safety equipment & safety personal protective equipments which we propose to bring to site in case the Contract is awarded to us.***
(n)	Attachment-11 (P)	Check list of documents to be submitted in Stage-II (Price) Bid.

2.2 **PRICE SCHEDULES**

In line with the requirements of the Bidding Documents, we enclose herewith the following Price Schedules, duly filled-in as per your proforma :

Schedule No. 1	Plant and Equipment (including Type Test charges) and Mandatory Spares to be supplied from abroad
Schedule No. 2	Plant and Equipment (including Type Test charges) and Mandatory Spares to be supplied from within the Employer's country.
Schedule No. 3	Local Transportation including port handling, port clearance, port charges, custom reconciliation inland transit insurance and other local costs incidental to delivery of plant and equipment and mandatory spares
Schedule No. 4	Installation Services including Erection Works, Civil, Structural and Allied Works, Insurance covers other than inland transit insurance and other services as specified in the bidding documents
Schedule No. 5	Grand Summary
Schedule No. 6	Recommended Spare Parts
Schedule No. 7	Goods and Services Tax (GST), applicable on Schedules - 2, 3 & 4, not included in bid price.
Schedule No. 7A	Import duty and Goods and Services Tax (GST), applicable on Schedule-1, not included in bid price.
Schedule No. 8A & 8B	Breakup of Type Test Charges in Schedule 1 & 2 respectively.
Schedule No. 9	Schedule of Take Out Price
Schedule No. 10	Schedule of Unit Rates
Schedule No. 11	Schedule of Alternatives
Schedule No. 12	Schedule of Optional Items/Services

3.1 We are aware that the Price Schedules do not generally give a full description of the work to be performed under each item and we shall be deemed to have read the Technical Specifications, Drawings and other sections of the Bidding Documents to ascertain the full scope of work included in each item while filling in the rates and prices. We agree that the entered rates and prices shall be deemed to include the full scope as aforesaid, including overheads and profit.

3.2 We declare that as specified in the General Conditions of Contract (Clause 11.2) prices quoted by us in the Price Schedule shall be subject to adjustment in accordance with Appendix-2 (Price Adjustment) to the Contract Agreement.

3.3 We understand that in the price schedules, where there are discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity, or between subtotals and the total price, (even in case of carry forward of prices) the unit or subtotal price shall prevail and the total price shall be corrected accordingly. We further understand that where there is a discrepancy between amounts stated in figures and amounts stated in words, the amount stated in words shall prevail. Similarly, in case of any discrepancies between the total bid price and the summation of Schedule prices (price indicated in a Schedule indicating the total of that Schedule), the total bid price shall be corrected to reflect the actual summation of the Schedule prices.

3.4 We declare that prices left blank in the Schedules will be deemed to have been included in the prices of other items. The TOTAL for each Schedule and the TOTAL of Grand Summary shall be deemed to be the total price for executing the Facilities in complete accordance with the Contract, whether or not each individual item has been priced.

4.0 We confirm that except as otherwise specifically provided, our Bid Prices include all taxes, duties, levies and charges including GST, assessed on us, our Sub-Contractor / Sub-Vendor, our assignee and our assignee's sub-contractor/sub-vendor (if applicable, in case of foreign bidders) or their employees by all Municipal, State or National Government authorities in connection with the Facilities, in and outside of India.

4.1 We understand that notwithstanding 4.0 above, we shall bear and promptly pay/reimburse all customs duties and GST, if imposedon the Plant and Equipment including Mandatory Spares to be supplied from abroad and specified in Schedule No.1 (and on recommended spare parts to be supplied from abroad and specified in Schedule No.6, if awarded) to be incorporated into the Facilities, by the Indian Laws. Further, you will reimburse the above Custom duties and GST subject to furnishing of documentary evidence by us.

However, we understand that if we choose to ship the equipment in Shipper’s Containers, then the custom duty,GST and any other tax/duty levied on the cost of such empty Containers shall not be borne by you and shall be borne and payable/reimbursable by us. Further, in case any additional duties under Customs like Anti-dumping duty, Counter-vailing duty on subsidised articles, Safeguard duty etc. and any other tax including GST, levies, cess etc. applicable in such additional duties, is imposed on Plant and Equipment including Mandatory Spares/ Recommended Spares, the same shall be borne and paid/reimbursed by us.

Further, payment of custom duty, custom clearances, any wharfage /demurrage /penalty, if levied on account of nonfulfillment of contractual obligation /documentation shall be to Contractor's account".

4.2 "We further understand that notwithstanding 4.0 above, you shall also bear and pay/reimburse to us/our Assignee (if applicable, in case of foreign bidder) GSTapplicable on: (a) Plant and Equipment (including Type Test Charges) and Mandatory Spares to be supplied from within the Employer's country specified in Price Schedule No. 2 (and also on locally supplied Recommended Spare Parts quoted in Price Schedule No. 6, when awarded) to be incorporated in the Facilities, by the law of country where the site is located, (b) local transportation & insurance, other local costs incidental to delivery of plant & equipment including mandatory spares specified in Price Schedule No. 3 (and also of locally supplied Recommended Spare Parts quoted in Price Schedule No. 6, when awarded) and (c) Installation Services including Erection, Civil & Allied Works and other services specified in Price Schedule No. 4. However, all other taxes, duties & levies as may be applicable on goods and services specified in Price Schedules Nos. 2, 3 & 4 and on the materials used for civil construction works and erection & commissioning shall be to our account and no separate claim in this regard will be entertained by you.

Taxes and Duties which are payable by the Employer under the Contract shall be reimbursed by the Employer to the Contractor after receipt of equipment/spares at site and on production of satisfactory documentary evidence by the Contractor. **However, GST as applicable on Down payment/Advance sanctioned to Contractor shall be paid to the Contractor alongwith the Down payment/Advance sanctioned. We undertake that the amount of this GST shall be progressively adjusted against Tax Invoices at the time of supply/dispatch of equipments.**

4.3 We confirm that we (or our Assignee, if applicable in case of foreign bidders as per para on Construction of Contract in Techno-Commercial Bid Form) shall get registered as per relevant GST laws.

4.4 **Income Tax**

We hereby declare that if any Indian Income Tax, surcharge on Income Tax and any other tax is attracted under the law, we agree to pay the same to the concerned authorities and you shall have no additional tax liabilities whatsoever irrespective of the mode of contracting.

5.0 COMPLIANCE TO THE PROVISIONS OF THE BIDDING DOCUMENTS

5.1 We have read all the provisions of the Bidding Documents and confirm that notwithstanding anything stated anywhere in our bid to the contrary, the provisions of the Bidding Documents are acceptable to us and we further confirm that we have not taken any deviation to the provisions of the Bidding Documents anywhere in our bid.

We have furnished our compliance to the provisions of the Bidding Documents and its subsequent Amendment(s)/Clarification(s)/Addenda/Errata by submitting Attachment -3P (Certificate of Compliance to all provisions of Bid Document).

Submission of above Attachment-3P shall be considered as our confirmation that any deviation to the Provisions of Bidding Documents found anywhere in our Bid Proposal, implicit or explicit, shall stand unconditionally withdrawn, without any cost implication whatsoever to the Employer, failing which our bid security shall be forfeited.

5.2 We further declare that additional conditions, variations, deviations, if any, found in the Price Bid, save those pertaining to any rebates offered, shall not be given effect to.

6.0 We declare that we have quoted the plant and equipment including spares to be supplied from abroad on CIF (Indian port-of-entry) basis.

@We confirm that we are seeking qualification on the basis of association/collaboration with the manufacturer(s) of particular equipment(s). We further confirm that the plant and equipment including mandatory spares, which shall be imported from the associate's/collaborator's country by the manufacturer or by us, have been listed in Attachment-7(P) to Bid Form and the price of these equipment and mandatory spares have been included in the total CIF (Indian port-of-entry) price quoted by us in Schedule-1.

6.1 **For Payments related to Erection / Civil / Site Fabricated Structural works**

We confirm that a single designated ESCROW account shall be opened by us in any Scheduled Bank of India under intimation to Employer. All payments related to Erection / Civil / Site Fabricated Structural works by the Employer due under the contract to us shall be released into above-mentioned ESCROW account set up as per the Tri-Partite Escrow Agreement between us, Employer, and Escrow Bank. The payment shall be disbursed in accordance with the mechanism set out in the Contract and Escrow Agreement. The purpose of the Escrow Account would be to ensure that payments received under the contract are solely used for implementation of the Contract. Under Tri-partite Escrow Agreement, the Escrow Bank will agree to ensure that amounts received in the ESCROW Account are utilized for making payments only to suppliers of goods and services related to Erection / Civil / Site Fabricated Structural works, statutory authorities, establishment expenses etc. as may be required in the performance of the contract.

We further confirm that all expenses/charges for opening /operation (including Annual Fee) of the Escrow Account shall be paid by us.

The draft agreement as annexed as Annexure-3 to Appendix-1 to Form of Contract Agreement, shall be followed for executing Escrow Account Agreement.

The Detailed Operative Procedure and Terms and Conditions of Escrow Account (Schedule III of draft agreement) shall be finalized between us, the Employer, and the Escrow Bank within 15 days of the placement of award.

7.0 We undertake, if our bid is accepted, to commence work on the Facilities immediately upon your Notification of Award to us and to achieve Completion of Facilities and conduct Guarantee Tests within the time specified in the Bidding Documents.

7.1 We confirm that, in terms of the requirement of Sub-Clause no. 44.01.00 (iv) under 'Work & Safety Regulations' (Clause no. 44.00.00 of Erection Conditions of Contract of Technical Specifications, Section-VI, Part-D of Bidding Documents), the 'Safety Plan' shall be submitted within 60 days from the date of award of contract for approval of Engineer-in-change (EIC) / Project Manager of Employer.

8.0 We hereby confirm that the rates/prices quoted by us in Schedule-9 (Schedule of Take Out Prices) and Schedule-10 (Schedule of Unit Rates) are consistent with the lumpsum bid price and that we shall furnish all necessary justification to establish the reasonableness of these rates/prices, if required by you. However, we clearly understand that the acceptance of our proposal for the subject package shall not mean automatic acceptance of these rates/prices and that these rates/prices shall be adopted only if their reasonableness has been established by us and accepted by you.

9.0 If our bid is accepted, we undertake to provide Down Payment Security, Contract Performance Securities, Performance Securities for Phase manufacturing programme and securities for Deed(s) of Joint Undertaking (as applicable) in the form and amounts and within the time specified in the Bidding Documents.

10.0 We agree to abide by this Stage-II (Price) Bid for a **period of 180 days** from the date of opening of bids as stipulated in the Bidding Documents and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period. Techno - Commercial Bid (Stage-I) including this Price Bid (Stage-II) shall remain valid and open for acceptance for One Hundred Eighty (180) days from date of Bid Opening of this Price Bid (Stage-II). Further, the prices of recommended spares contained in our Bid shall remain valid for a period of 6 months after placement of Notification of Award for main equipment and mandatory spares.

11.0 Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below:

Name and address of agent	**Amount and Currency**	**Purpose of Commission or gratuity**

(If none, state "none")

12.0 Until a formal Contract is prepared and executed between us, this bid, together with your written acceptance thereof in the form of your Notification of Award shall constitute a binding contract between us.

13.0 We understand that you are not bound to accept the lowest or any other bid you may receive.

14.0 We confirm that cost of Special Tools & Tackles furnished by us in Attachment-4A of our Stage-I (Techno-Commercial) Bid is included in lumpsum price quoted in this Price Bid.

15.0 DELETED

16.0 We, hereby, declare that only the persons or firms interested in this proposal as principals are named here and that no other persons or firms other than those mentioned herein have any interest in this proposal or in the Contract to be entered into, if the award is made on us, that this proposal is made without any connection with any other person, firm or party likewise submitting a proposal, is in all respects for and in good faith, without collusion or fraud.

Dated this.....day of.....20.....

Thanking you, we remain,

Yours faithfully,

Date :

Place :

(Signature).....

(Printed Name).....

(Designation).....

(Company Seal).....

AMENDMENT NO 20 TO BIDDING DOCUMENTS (TECHNICAL SPECIFICATION)

SL. NO.	SPECIFICATION REFERENCE				Existing	Read as
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
1	VI/B	A-01	3 of 3	1.06.00	New clause added	a) Provision for life consumption/Equivalent Operating Hours (EOH) of critical components due to Creep & Fatigue shall be made available online (display in CCR) for operating personnel. Also program/measures shall be made available online (display in CCR) to guide the operating personnel for maintenance planning. b) Resulting Damage Factor due to Creep-Fatigue interaction shall be made available online (display in CCR) for Operating personnel.
2	VI/B	A-3	24 of 92	1.20.00/ (q)	New clause added	All the piping, fittings, valves, oil tanks, strainers including body and element associated with oil system of HP & LP bypass system shall be of stainless steel.

3	General VI/A	A-2	1/3	1.03.00	**First Fill of Consumable, Oils & Lubricants** All the first fill of consumables and one Year's topping requirements of consumable such as greases, oil, lubricants, servo fluids/control fluids, gases (excluding H2,CO2 and N2 for Generator) and essential chemicals etc. which will be required to put the equipment covered under the scope of specifications, into successful commissioning/initial operation and to establish completion of facilities shall be furnished by the Contractor. Suitable standard lubricants as available in India are desired. Efforts should be made to limit the variety of lubricants to minimum. Bidder scope shall also include supply of H2,CO2 and N2 as applicable for the Generator till successful commissioning of the Generator. Bidder shall also supply a quantity not less than 10% of the full charge or one (1) year topping requirement mentioned above (Whichever is higher) of each variety of lubricants, servo fluids, gases, chemicals etc (as detailed above). used which is expected to be utilised during the first year of operation. This additional quantity shall be supplied in separate Containers.	**First Fill of Consumable, Oils & Lubricants** **i.** All the first fills of consumables and one year's topping requirements of consumables such as greases, oil, lubricants, servo fluids / control fluids, gases (excluding H2, CO2 and N2 for Generator) ~~**and essential chemicals**~~ etc. which will be required to put the equipment covered under the scope of specifications, into successful commissioning / initial operation and to establish completion of facilities shall be ~~**furnished**~~ **supplied** by the Contractor. Suitable standard lubricants as available in India are desired. Efforts should be made to limit the variety of lubricants to minimum. Bidder ~~**scope shall also include**~~ shall ~~**also**~~ supply a quantity not less than 10% of the full charge or one (1) year topping requirement mentioned above (Whichever is higher) of each variety of lubricants, servo fluids, gases, ~~**chemicals**~~ etc.(as detailed above) used which is expected to be utilized during the first year of operation. This additional quantity shall be supplied in separate Containers. **ii. Bidder scope shall supply H2, CO2 and N2 as applicable for the Generator till successful commissioning of the Generator.**
4	VI/B	A-3	27 of 92	1.22.01 (o)	All HP heaters out of service under rated steam conditions at condenser pressure of 77 mm Hg (abs) and 89 mm Hg (abs) with zero percent make up and 3% make-up and rated output.	All HP heaters out of service under rated steam conditions at condenser pressure of 77 mm Hg (abs) and 89 mm Hg (abs) with zero percent make up and 3% make-up and ~~rated~~ output **not less than 660 MW or output corresponding to design BMCR heat duty, whichever is lower.**
5	VI/B	A-3	50 of 92	5.02.00/ (g)	Hardened 400 series stainless steel impingement plates for flashed drain inlet from HP heaters, BFP recirculation, boiler startup drains etc.	Hardened 400 series **or 304 series** stainless steel impingement plates for flashed drain inlet from HP heaters, BFP recirculation, boiler startup drains etc.

6	VI/B	A-3	11 of 92	1.06.01	**On-line Blade Vibration Monitoring System for Low Pressure (LP) Turbines (in case Free Standing Blades are offered)** (a) System Requirement (1)……. (2)……. …….. …….. (21)…….	**On-line Blade Vibration Monitoring System for Low Pressure (LP) Turbines (in case Free Standing Blades are offered)** (a) System Requirement (1)……. (2)……. …….. …….. (21)……. **NOTE: In case the Blade design comprises integral shroud and snubber which becomes integral at higher speed due to continuous centrifugal force shall not be treated as free standing blade.**

7	VI/B	A-3	16 of 92	1.13.00/ (d)	**INSULATION (STEAM TURBINE AND BFP)** …….. (d) The thermal insulation for the turbine casing shall preferably be insulated by preformed ceramic mattress blankets conforming to IS15402 or equivalent. These mattresses are fixed over the casing and held in position by metallic washers fastened to the MS rod welded to the casing. To meet the thickness requirements, multiple layers of mattresses may be applied. Alternatively, bidder may apply turbine insulation as per their standard practice i.e. sprayed insulation produced by projecting specially prepared mineral wool along with a fine liquid spray. However, the casing parting plane shall necessarily be provided with blanket type insulation. The bidder may apply complete spray type or complete blanket type or combination of both of above as per their standard practice. These blankets shall consist of high temperature felted mineral insulation fully enclosed in wire inserted asbestos free cloth for temperature exposure to 445oC to 595oC. A single layer of blanket shall not be more than 75 mm thick. Voids around the blankets should be avoided. However, unavoidable voids shall be filled with loose mineral wool.	**INSULATION (STEAM TURBINE AND BFP)** …….. (d) The thermal insulation for the turbine casing shall ~~**preferably**~~ be insulated by preformed ceramic mattress blankets conforming to IS15402 or equivalent. These mattresses are fixed over the casing and held in position by metallic washers fastened to the MS rod welded to the casing. To meet the thickness requirements, multiple layers of mattresses may be applied. ~~**Alternatively, bidder may apply turbine insulation as per their standard practice i.e. sprayed insulation produced by projecting specially prepared mineral wool along with a fine liquid spray. However, the casing parting plane shall necessarily be provided with blanket type insulation. The bidder may apply complete spray type or complete blanket type or combination of both of above as per their standard practice.**~~ These blankets shall consist of high temperature felted mineral insulation fully enclosed in wire inserted asbestos free cloth for temperature exposure to 445ºC to 595ºC. A single layer of blanket shall not be more than 75 mm thick. Voids around the blankets should be avoided. However, unavoidable voids shall be filled with loose mineral wool.

8	VI/B	A-3	33 of 92	2.02.00 (a)	The Condenser shall be designed for heat load corresponding to valve wide open (VWO) condition, 3% makeup and guaranteed condenser pressure and conditions given at Annexure-II of this sub-section. The value of condenser pressure to be measured at 300 mm above the top row of condenser tubes shall be demonstrated under VWO output condition, 3% make-up. The condenser vacuum shall be measured with a vacuum grid utilizing ASME basket tips. The grid is fitted at 300 mm above top row of tubes of condenser. Condensate temperature at all loads shall be near to the saturation temperature corresponding to condenser pressure	The Condenser shall be designed for heat load corresponding to valve wide open (VWO) condition**, 0% makeup** and guaranteed condenser pressure and conditions given at Annexure-II of this sub-section. The value of condenser pressure to be measured at 300 mm above the top row of condenser tubes shall be demonstrated under VWO output condition**, 0% make-up.** The condenser vacuum shall be measured with a vacuum grid utilizing ASME basket tips. The grid is fitted at 300 mm above top row of tubes of condenser. Condensate temperature at all loads shall be near to the saturation temperature corresponding to condenser pressure
9	VI/A	A-3	9 of 10	13.00.00	**TOOLS AND TACKLES** **13.01.00** The set of maintenance and repair tools including all special tools and tackles used during the installation, commissioning, testing, calibration, modification and maintenance shall be handed over to the employer. **13.02.00** In addition, one set of all special tools and tackles required for the installation, commissioning, testing, calibration, modification and maintenance of equipment(s)/ system shall also be supplied. These tools and tackles shall not be used for erection/commissioning purposes and shall be in new condition, when handed over to the Employer. These tools and tackles shall be separately packed and brought to site. A list of all such special tools and tackles shall be submitted along with the offer.	**TOOLS AND TACKLES** ~~**13.01.00**~~ ~~**The set of maintenance and repair tools including all special tools and tackles used during the installation, commissioning, testing, calibration, modification and maintenance shall be handed over to the employer.**~~ **13.01.00** One set of all special tools and tackles required for the installation, commissioning, testing, calibration, modification and maintenance of equipment(s)/ system shall be supplied. These tools and tackles shall not be used for erection/commissioning purposes and shall be in new condition, when handed over to the Employer. These tools and tackles shall be separately packed and brought to site. A list of all such special tools and tackles shall be submitted along with the offer.
10	VI/G	TDS/ DA2(I)	4 of 30	1.01.01	(x) **65%** unit rated output under modified sliding pressure operation at condenser pressure of 77 mm Hg (abs) with 0% and 3% make up.	(x) **60%** unit rated output under modified sliding pressure operation at condenser pressure of 77 mm Hg (abs) with 0% and 3% make up

11	Amendment no. 14	GTR	53	24.00.00	**Software based project monitoring tool**	**Deleted**
12	**VI/ Part B**	**SUB-SECTION-IIIC-18 WIRELESS INSTRUMENTS & SYSTEM INCLUDING FIELDBUS INSTRUMENTS**	**7 of 10**	**11.00.00**	**FIELD INSTRUMENTS BASED ON FIELDBUS** The following instruments shall be connected to DDCMIS through fieldbus i.e. FOUNDATION Fieldbus/PROFIBUS PA protocol complying to IEC 61158 directly from transmitter.	**FIELD INSTRUMENTS BASED ON FIELDBUS** The following instruments shall be connected to DDCMIS through fieldbus i.e. FOUNDATION Fieldbus/PROFIBUS PA protocol complying to IEC 61158 directly from transmitter. **For all fieldbus based instruments, GSD and DTM files are to be provided which shall be configured/ tested with DCS for proper interfacing and diagnostics.**

13	VI/ Part B	IIIC-19 ELECTRIC ACTUATORS	3 of 4	3.01.00	**INTERFACES:** For ON-OFF and INCHING type actuators interface with the control system shall be through hardwired signal only. (a) Open/Close command ….shall be provided hardwired. …… (d) For typical wiring diagram Refer Tender Drawing No. 0000-999-POI-A-063 (Except plug & socket connector, if not applicable)	**INTERFACES:** For ON-OFF and INCHING type actuators interface with the control system shall be through hardwired signal only. (a) Open/Close command ….shall be provided hardwired. …… (d) For typical wiring diagram Refer Tender Drawing No. 0000-999-POI-A-063 (Except plug & socket connector, if not applicable) **(e) For INCHING type actuators, hardwired analog position signal (4-20mA) derived from absolute encoder to be provided for actuator position.**
14	VI/ Part B	IIIC-19 ELECTRIC ACTUATORS	3 of 4	4.01.00	**INTERFACES:** For ON-OFF and INCHING type actuators interface with the control system shall be through fieldbus network. (a) Open/ close commands ….the fieldbus network. (b) All actuators ……any manual intervention. (c) Open/close command termination logic shall be suitably built inside actuator.	**INTERFACES:** For ON-OFF and INCHING type actuators interface with the control system shall be through fieldbus network. (a) Open/ close commands ….the fieldbus network. (b) All actuators ……any manual intervention. **Also, for Profibus DP cable connection, suitable connector integral to the actuator, or external devices/ accessories (mounted inside minimum IP65 protection class enclosure) shall be provided so that the actuator can be isolated online from the profibus network without disturbing the Profibus communication of other actuators of the segment.** (c) Open/close command termination logic shall be suitably built inside actuator. (d) **For all actuators GSD and DTM files are to be provided which shall be configured/ tested with DCS for proper interfacing and diagnostics.**

15	VI/ Part A	SUB-SECTION - IIIC-02 DDCMIS ANNEXURE IIIC-02K	1 of 3	1.02.00	The fieldbus segment design shall be finalized and validated based on functional requirements as per: • Process requirements (P&IDs/ operational requirements). ..... However, all such segment device allocation, topology shall be decided during detailed engineering.	**New point Added** The fieldbus segment design shall be finalized and validated based on functional requirements as per: • Process requirements (P&IDs/ operational requirements). ..... • **Profibus DP network termination shall be designed such that absence of power supply to terminating device in network does not affect other devices in the network. The Contractor shall furnish details and this shall be finalized during detailed engineering stage.** • **For all fieldbus devices GSD and DTM files are to be provided and configured/ tested in the DCS for proper interfacing and diagnostics.** However, all such segment device allocation, topology shall be decided during detailed engineering.

16	VI/ Part A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	28 of 33	16.00.00	ELECTRICAL ACTUATORS Electric actuators with integral starters along with associated accessories etc shal be supplied on as required basis for Valves / Dampers to meet the functional and the other specification requirements. Following types of Electric Actuators are envisaged for the project: a) Non-intrusive Hardwired Electric Actuators b) Non-intrusive Fieldbus based Electric Actuators. For detail specification refer Sub-section-IIIC-19, Part -B, Section-VI of Technical Specification Applications are defined at Clause no.1.11.00 above. For erection and commissioning of above specified actuators, qualified and experienced engineers of actuator manufacturer shall be deputed at site. thereafter actuator service Engineer shall be deputed on call basis upto completion of facilities of the plant for troubleshooting and maintenance of actuators and proper interfacing with DDCMIS. Qualified and experienced engineers indicated above shall have expertise in all aspects of nonintrusive actuators along with fieldbus protocol and interfacing with DDCMIS.	ELECTRICAL ACTUATORS Electric actuators with integral starters along with associated accessories etc shall be supplied on as required basis for Valves / Dampers to meet the functional and the other specification requirements. Following types of Electric Actuators are envisaged for the project: a) Non-intrusive Hardwired Electric Actuators b) Non-intrusive Fieldbus based Electric Actuators. **If electric actuator requires any additional power supply/ signal for its operation complying to specification requirements, then required power supply, cabling and termination etc. shall be provided by the contractor.** For detail specification refer Sub-section-IIIC-19, Part -B, Section-VI of Technical Specification Applications are defined at Clause no.1.11.00 above. For erection and commissioning of above specified actuators, qualified and experienced engineers of actuator manufacturer shall be deputed at site. thereafter actuator service Engineer shall be deputed on call basis upto completion of facilities of the plant for troubleshooting and maintenance of actuators and proper interfacing with DDCMIS. Qualified and experienced engineers indicated above shall have expertise in all aspects of nonintrusive actuators along with fieldbus protocol and interfacing with DDCMIS.

17	VI/ A	**SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM**	**3 of 33**	1.11.01	"For close loop control of following applications of main plant SG/TG/BOP (Auxiliaries of SG and TG), conventional i.e. 4-20 mA / (HART) based actuators along with 4-20 mA (HART) based electronic transmitters (which are directly used in control of final control element), shall be provided. For balance measurements for even these areas/ applications fieldbus based PT/DPT/TT shall be provided. .... For balance applications of main plant and for all applications of other areas including offsite areas fieldbus based control system, fieldbus based actuators and fieldbus based PT/DPT/TT shall be provided."	"For close loop control of following applications of main plant TG/ TG BOP (Auxiliaries of TG), conventional i.e. 4-20 mA / (HART) based actuators along with 4-20 mA (HART) based electronic transmitters (which are directly used in control of final control element), shall be provided. For balance measurements for even these areas/ applications fieldbus based PT/DPT/TT shall be provided. .... For balance applications of main plant and for all applications of other areas including offsite areas fieldbus based control system, fieldbus based actuators and fieldbus based PT/DPT/TT shall be provided."
18	**VI/ Part A**	**SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM**	**4 of 33**	**1.11.02 , G.**	The actuators shall be fully compatible with the valves being provided in this package. Further, 20 Nos. configuration/ diagnostic tool (if applicable) for nonintrusive actuators and 20 nos. configuration/ diagnostic tool (if applicable) for all fieldbus compatible devices shall be provided for complete package.	**Contractor shall provide Configuration/ Diagnostic tools for filedbus (FF/ Profibus) network/ devices as below :** **a. Configuration/ diagnostic tool (if applicable) for non-intrusive actuators - 5 Nos. or 5% of total quantity of actuator whichever is more.** **b. Configuration/ diagnostic tool for all Foundation Fieldbus based instruments – 2 Nos of each make.** **c. Configuration/ diagnostic tool for Profibus network like Profitrace/ Profibus modem – 2 nos. per DDCMIS.** **Contractor shall provide all required software (lifetime licensed) and hardware (cables/ connectors, Tablet/ Laptop etc.) along with these tools.**
19	VI/A	SUB-SECTION-IIC, CONTROL & INSTRUMENTATION SYSTEM	14 of 39	2.04.15	"DDCMIS vendor shall upgrade/ update all DDCMIS system along with Station LAN to the latest version..... contractor within the contract price."	"DDCMIS vendor shall upgrade/ update all DDCMIS system along with ~~Station~~ **TG** LAN to the latest version..... contractor within the contract price."

AMENDMENT NO 20 TO BIDDING DOCUMENTS (TECHNICAL SPECIFICATION)

<table>
<tr>
<td>20</td>
<td>VI/A</td>
<td>SUB-SECTION-IIC, CONTROL & INSTRUMENTATION SYSTEM

ANNEXURE-I TO CONT. QUAN. FOR DDCMIS</td>
<td>2 of 2</td>
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<table>
<tr><td></td><td>TG LAN
Unit</td><td>Quantity per Unit</td><td>Quantity Common</td></tr>
<tr><td>…..</td><td></td><td></td><td></td></tr>
<tr><td>Redundant TG LAN</td><td>Sets</td><td></td><td>1</td></tr>
<tr><td>Redundant TG LAN Switch</td><td>Sets</td><td></td><td>1</td></tr>
<tr><td>…</td><td></td><td></td><td></td></tr>
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<table>
<tr><td></td><td>TG LAN
Unit</td><td>Quantity per Unit</td><td>Quantity Common</td></tr>
<tr><td>…..</td><td></td><td></td><td></td></tr>
<tr><td>Network Management Server along with Software</td><td>Sets</td><td></td><td>1</td></tr>
<tr><td>Redundant TG LAN</td><td>Sets</td><td></td><td>1</td></tr>
<tr><td>Redundant TG LAN Switch</td><td>Sets</td><td></td><td>1</td></tr>
<tr><td>Hardware Firewall in failover mode with IPS</td><td>Nos.</td><td></td><td>2</td></tr>
<tr><td>VPN Router for Remote Service Centre Connectivity</td><td>Nos.</td><td></td><td>1</td></tr>
<tr><td>…..</td><td></td><td></td><td></td></tr>
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Please Note: With this amendment, point no. 29 of Amendment No. 14 to bidding documents (technical specifications) that was issued earlier stands withdrawn.
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<tr>
<td>21</td>
<td>VI/A</td>
<td>MANDATORY SPARES, C&I MANDATORY SPARES</td>
<td>33 of 59</td>
<td>1.00.00, (1.)</td>
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<table>
<tr><td>A.</td><td>(v) Server for Station LAN</td><td>1 No.</td></tr>
<tr><td>..</td><td>…</td><td></td></tr>
<tr><td>D.</td><td>(i) Switch/repeaters/ hubs/ firewalls for DDCMIS including Station LAN etc.</td><td>2 nos. of each type and model</td></tr>
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<table>
<tr><td>A.</td><td><s>(v) Server for Station LAN</s></td><td><s>1 No.</s></td></tr>
<tr><td>..</td><td>…</td><td></td></tr>
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22	VI/B	IIIC-13	8 of 9	4.01.00 ,	This shall include piping, fittings, valves and accessories from tapping point upto SWAS conditioning panel located in SWAS room on as required basis. All sample piping shall be 3/4" NB seamless type of material ASTM A213 TP 316 H, conforming to ANSI B36.19. The schedule number shall be suitable for the particular application.	This shall include piping, fittings, valves and accessories from tapping point upto SWAS conditioning panel located in SWAS room on as required basis. All sample piping shall be 3/4" NB seamless type of material ASTM A213 TP 316 H (conforming to ANSI B36.19) **or better (as per process pipe)**. The schedule number shall be suitable for the particular application.
				4.02.00	All fittings shall be socket welding type and of material ASTMA182 F316H conforming to ANSI B 16.11.	All fittings shall be socket welding type and of material ASTMA182 F316H (conforming to ANSI B 16.11) **or better (as per process pipe).**
				4.02.05	Material Specifications for Sample Pipe Lines The piping to be furnished and installed for water and steam analysis system shall be as indicated below: -----	Material Specifications for Sample Pipe Lines The piping material to be furnished and installed for water and steam analysis system **shall have minimum specification** as indicated below: -----

23	VI/B	D-01	11 OF 142	5.02.01	Main Power House **iii. Architectural Features** This building shall be of Structural Steel ..... Glazing for A Row & gable end shall be reflective 6mm thick clear toughened glass with Aluminium frame. Hermetically sealed double glazing shall be provided between air conditioned & non air conditioned areas. Internal glazed partition in side CCR/CER/Offsite Control Room and B-Row at operating floor level shall be of fire resistant glass having 2 (Two) hour fire rating and with suitable frame. **Light weight aerated concrete panels** with Single Skin Metal Panel cladding shall be provided in exterior of UPS Battery room area and Control Equipment Room area. All internal side of **Aerated concrete panel** and columns in air-conditioned areas in MPH shall be encased with Aluminium Composite panel cladding from inside.	Main Power House **iii. Architectural Features** This building shall be of Structural Steel ..... Glazing for A Row & gable end shall be reflective 6mm thick clear toughened glass with Aluminium frame. Hermetically sealed double glazing shall be provided between air conditioned & non air conditioned areas. Internal glazed partition in side CCR/CER/Offsite Control Room and B-Row at operating floor level shall be of fire resistant glass having 2 (Two) hour fire rating and with suitable frame. **Autoclaved aerated Concrete Block** with Single Skin Metal Panel cladding shall be provided in exterior of UPS Battery room area and Control Equipment Room area. All internal side of **Autoclaved aerated Concrete Block wall** and columns in air-conditioned areas in MPH shall be encased with Aluminium Composite panel cladding from inside.
24	VI/B	D-01	20 OF 142	5.04.00	Complete sewerage system … … … … … …subject to minimum combined capacity of **40** Cum/day. … … … Alternatively, bidder may provide a 'Centralized Sewage Treatment Plant' for complete plant facilities with minimum combined capacity of **40** cum/day and MBBR technology shall be used for centralized sewerage treatment plant.	Complete sewerage system … … … … … …subject to minimum combined capacity of **20** Cum/day. … … … Alternatively, bidder may provide a 'Centralized Sewage Treatment Plant' for complete plant facilities with minimum combined capacity of **20** cum/day and MBBR technology shall be used for centralized sewerage treatment plant.
25	VI/B	D-01	39 – 50 of 142	7.00.00	FOUNDATION SYSTEM AND GEOTECHNICAL DATA	FOUNDATION SYSTEM AND GEOTECHNICAL DATA **Revised Clause 7 and its Sub Clauses are attached as Annexure-I**
26	VI/B	D-01	62 of 142	8.07.01. 2 e)	All butt welds with plates thicker than 50mm and all site butts weld of main framing beam shall require post weld heat treatment as per procedure given in AWS D-1.1. Post heating shall be done up to 600°C and rate of application shall be 200°C per hour. The post heat temperature shall be maintained for 60 minutes per 2.5 cm. thickness. For maintaining slow and uniform cooling, **asbestos** pads shall be used for covering the heated areas.	All butt welds with plates thicker than 50mm and all site butts weld of main framing beam shall require post weld heat treatment as per procedure given in AWS D-1.1. Post heating shall be done up to 600°C and rate of application shall be 200°C per hour. The post heat temperature shall be maintained for 60 minutes per 2.5 cm. thickness. For maintaining slow and uniform cooling, **asbestos free** pads shall be used for covering the heated areas.

27	VI/B	D-01	77 of 142	9.07.05	For control room , control equipment room, walls shall be of factory made composite modular light weight aerated concrete panels,(minimum 2 hours of fire rating) … … … … … …which is used at the top and bottom.	For control room, control equipment room, walls shall be constructed of **Aerated Concrete Block (except in toilet and pantry area, where brick shall be used).**
28	VI/B	D-01	87 of 142	9.13.05	Pre-Painted Coil coated Steel false ceiling system, at all level, for all kind of works, consisting of 0.5 mm thick galvanised as per IS: 277, along with galvanised supporting steel members exposed faces of galvanised member to be prepainted with regular modified polyester coating / super polyester coating minimum 20 DFT, to form panels of specified size for tile type panels and roll formed stove enamelled 0.6 mm thick steel carrier, for fixing of lineal type panels by clip on arrangement, suspended from RCC slab / structural steel or catwalk way steel channel grid above with 4 mm (minimum) galvanised wires (rods), with special height adjustment clips, providing angle section of minimum 25 mm leg width along the perimeter of ceiling, including all labour, material, supporting grid system (members minimum 0.8 mm thick and galvanised as per IS: 277) anchor fasteners for making suspension arrangement from RCC, providing openings for AC ducts, return air grills, insulation light fixtures, etc., all complete.	Aluminium false ceiling shall be in 600 mm x 600 mm tile of 0.6 mm thk.(minimum) with perforation of 2.5 mm dia in combination with built in nonwoven tissue for providing good acoustic properties having coil coating of thickness 25micron (minimum)and installed with T-Grid (of profile 24 mm) in same or contrasting colours or with 6 mm recess joints. The whole system shall be level adjusting arrangement and shall be suspended as per manufacturer guidelines of Luxalon, Armstrong or equivalent. Alluminium false ceiling shall be of Luxalon, Armstrong or equivalent.
29	VI/B	D-01	91-97 of 142	9.16.00	TABLE - B	TABLE - B **Revised Table-B is attached as Annexure-II**
30	VI/B	D-01	104 of 142	11.02.00	Workmanship and **dimensional** shall be checked as stipulated **below.**	Workmanship and **dimensions** shall be checked as stipulated **in Part-B, Sub-Section E-47**
31	VI/B	D-01	123-134 of 142	Annexure-C	Annexure C – BORE LOG DATA	Annexure C – BORE LOG DATA **Revised Annexure-C to Sub-Section D-01 of Part-B of Technical Specification is attached as Annexure-III.**
32	Amendment No. 4 S.No. 158	-	80 of 91	S.No. 158	**Water** Contractor shall make all arrangements himself for the supply of construction water as well as potable water for labour and other personnel at the worksite/colony. However, potable water can be drawn from bore-well if found suitable *and permitted by Statutory Authority*. Any statutory clearance required shall be obtained by the contractor.	**Water** Contractor shall make all arrangements himself for the supply of construction water as well as potable water for labour and other personnel at the worksite/colony. However, **construction**/potable water can be drawn from bore-well if found suitable *and permitted by Statutory Authority*. Any statutory clearance required shall be obtained by the contractor
33	Amendment No. 7		1 of 1	S.No. 1	Drawing no. 9915-999-POC-F-001 **(REV. 1)** titled "GENERAL LAYOUT PLAN"	Drawing no. 9915-999-POC-F-001 **(REV. 2)** titled "GENERAL LAYOUT PLAN"

34	Amendment No. 7		1 of 1	S.No. 2	… … … 9915-371-POC-A-002 titled "Layout of Roads" and 9915-371-POC-A-003 titled "Layout of Drains" added for information purpose only … … …	… … … 9915-371-POC-A-002 titled "Layout of Roads" **Rev-B** and 9915-371-POC-A-003 **Rev-C** titled "Layout of Drains" added for information purpose only … … …
35	VI/E	Tender drawing		Sl.No.-3	Layout plan at 8.5M/17.0M/24.0M/24.0M/28.0M/32.0M/38.0M, Drg No-9915-999-POM-F-002 (Rev-A)	Layout plan at 8.5M/17.0M/24.0M/24.0M/28.0M/32.0M/38.0M, Drg No-9915-999-POM-F-002 (Rev-B)
36	VI/A	A2	3 of 3	1.07.01	Contractor shall prepare 3D design review model (network ready, which shall include visual interference check, walk-through animation, video simulation for major equipment placement and removal, visual effect, photo realism etc), which is extracted from intelligent 3D model, for employer's review as & when desired by employer. However, all piping layouts, equipment layouts, floor plans, ducting layout (Air/flue gas, A/C, Ventilation etc.), structural arrangement drawings and RCC layout drawings shall necessarily be extracted from the aforesaid 3D model and submitted for employer's review along with the 3D review model to enable NTPC to review and approve these drawings.	Contractor shall prepare 3D design review model (network ready, which shall include visual interference check, walk-through animation, video simulation for major equipment placement and removal, visual effect, photo realism etc), which is extracted from intelligent 3D model, for employer's review as & when desired by employer. However, all piping layouts, equipment layouts, floor plans, ducting layout (Air/flue gas, A/C, Ventilation etc.) and structural arrangement drawings shall necessarily be extracted from the aforesaid 3D model and submitted for employer's review along with the 3D review model to enable Owner to review and approve these drawings
37	**VI Part - A**	**SPARES**	**26 of 59**	**21. Low Pressure Piping**	a) Valves up to size 250 NB …… b) Valves above 250 NB ……..	**Note:** 1. If there is one no valve only of particular type, class and size then only one no is required. 2. Wherever valves are specified as mandatory spare, complete valve along with actuator and all other accessories which are the part of original supply shall also be supplied

38	**VI Part -A**	**SPARES**	**28 of 59**	**22. Power Cycle Piping**	**1.** Spare gaskets / pressure seal gaskets of all the gate valves of sizes 15 NB to 500 NB …… …… …… …… 25. Complete Valve assembly for sizes above 250 NB	**Note:** 1. Mandatory spare requirements of Valves and specialties for power cycle piping systems (Sub Section: II-A04 of Part-A of Technical Specifications) specified above does not include items/valves/specialties which are already specified/ covered elsewhere in this Technical specification for mandatory spare requirement. 2. Wherever complete valve assembly as mandatory spare has been specified above for power cycle piping, it shall include complete gear operator/ box assembly which forms part of original valve assembly/supply. 3. Mandatory spares for valve actuators (for Pneumatically, Hydraulically & Electrically operated valves) shall be supplied as per actuator quantity/details specified elsewhere in this technical specification for mandatory spare requirement. 4. Mandatory spare requirement for complete valve assembly above 50NB in power cycle piping systems shall include Gate valve, Globe valve, check valve, safety valve, Angle valve, butterfly valve etc. 5. In case the quantity of mandatory spares so calculated happens to be a fraction, the same shall be rounded off to next higher whole number. For example 10% of 11 is equal to 1.1, then it should be rounded as 2 instead of 1. **6.** In case any of the above specified mandatory spares / Items are not covered in the actual design / supply, then that spares / items may be treated as "not applicable".

39	**VI Part -A**	**TERMINAL POINTS & EXCLUSIONS**	**2 of 6**	**5.01.01**	For each unit, Bidder to tap off Secondary circuit cooling water …….the hot water into the CW system discharge pipe at the downstream of condenser.	For each unit, Bidder to tap off Secondary circuit cooling water from the Circulating Water System pipe/duct at the upstream of condenser and terminate the hot water into the CW system discharge pipe/duct at the downstream of condenser.
40	**VI Part -A**	**TERMINAL POINTS & EXCLUSIONS**	**3 of 6**	**5.02.00**	For all other plant water system terminal points, ……. ……titled "Pipe & Trestle Layout ".	For all other plant water system terminal points, Bidder to refer the Doc.No.CW-CS-9915-999-POM-A-037 titled "Plant Water Scheme & TP details" and Doc.No. 9915-999-POM-F-006 titled "Pipe & Trestle Layout ". Boiler Fill Tap-off to be given to owner for use in SG area shall be terminated for each Unit separately.
41	**VI Part -A**	**TERMINAL POINTS & EXCLUSIONS**	**3 of 6**	**6.00.00**	For Compressed Air System terminal points, Bidder……. ……titled "Pipe & Trestle Layout ".	For Compressed Air System terminal points, Bidder to refer the Doc. No.CW-CS-9915-999-POM-A-037 titled "Plant Water Scheme & TP details" and Doc.No. 9915-999-POM-F-006 titled "Pipe & Trestle Layout ". Service & Instrument Air Tap-off to be given to Owner for use in SG Area shall be terminated for each Unit separately.

42	**VI Part -B**	**Annexure-A, Amendment 04_Part B_Low Pressure Piping. Sub Section A6**	**13 of 21**	**2.13.01 (a) (2)**	**Stainless steel valves** Body & Bonnet SS 304 Disc -do- Trim. SS 316	**Stainless steel valves** Body & Bonnet SS 304 / SS 316 Disc -do- Trim. SS 304 / SS 316
43	VI/Part-E			Tender Drawing 9915-999-POM-A-004	9915-999-POM-A-004	Refer revised Tender drawing in Annexure.
44	VI Part -A	Sub. Sec. A-5	2 of 2	2.04.00 (h)	Complete Effluent transfer system up to Ash slurry sump …… pumps, piping, valves, fittings etc.	Complete Effluent transfer system up to Ash slurry sump …… pumps, piping, valves, fittings etc. Piping shall be terminated at terminal point, however the pumps head shall be sufficient for effluent disposal upto the final discharge point.
45	VI Part -A	Sub. Sec. A-5	2 of 2	2.04.00 (i)	Waste water generated during resin transfer operation …… along with piping, valves, fittings, Resin transfer waste water disposal pumps (2x100%) etc.	Waste water generated during resin transfer operation …… along with piping, valves, fittings, Resin transfer waste water disposal pumps (2x100%) etc. Piping shall be terminated at terminal point, however the pumps head shall be sufficient for effluent disposal upto the final discharge point.

46	VI/A	B1	11 of 15	Annexure-A	(table below)	(table below)

Sl No.	Description	Rating	DC	DE	DD	DBF	G	LV Panel
Category I.	**Employer's feeder requirement**							
3	Employer's requirement in 11kV Station Switchgear 1SA	As per Tender SLD		2				
7	Employer's requirement in 11kV Station Switchgear 2SA	As per Tender SLD		2				
Category II.	**Employer's Switchgear Requirement**							

Sl No.	Description	Rating	DC	DE	DD	DBF	G	LV Panel
Category I.	**Employer's feeder requirement**							
3	Employer's requirement in 11kV Station Switchgear 1SA	As per Tender SLD		2		1		
7	Employer's requirement in 11kV Station Switchgear 2SA	As per Tender SLD		2		1		
Category II.	**Employer's Switchgear Requirement**							
10	11kV Miscellaneous Swgr	1000A	2	6	1		2	2

47	VI/A	B1	11 of 15	Annexure-A	Note: 1. In Category I, Feeders of equipment (Motors, Transformers, etc.) in the scope of STG Island Package have not been considered ..... shall be considered as per the technical specifications. 2. Above Employer's BOQ is tentative, which may vary during detailed Engineering. Final BOQ shall be provided during detailed Engineering. 3. Spares shall be considered as per Technical Specification for Switchgears under Category I. Spares have been included in Category II Switchgears (Employer's switchgear requirement).	Note: 1. In Category I, Feeders of equipment (Motors, Transformers, etc.) in the scope of **TURBINE GENERATOR AND ASSOCIATED PACKAGES** have not been considered ..... shall be considered as per the technical specifications. 2. Above Employer's BOQ is tentative, which may vary during detailed Engineering. Final BOQ shall be provided during detailed Engineering. 3. Spares shall be considered as per Technical Specification for Switchgears under Category I. Spares have been included in Category II Switchgears (Employer's switchgear requirement). **4. For both category I & II, Employer's feeder requirement: DC/DE Breaker rating shall be same as or higher than switchboard rating. DD breaker rating shall be 2/3rd of Switchboard rating or higher. DBF/DBF1 breaker rating shall be minimum 1250A. CC/CCT Vacuum contactor rating shall be minimum 400A. DA/DAF/DB breaker rating shall be minimum 800A.**
48	VI/B	B-7	2 of 11	6.01.01	Pressurisation System The pressurization of the busduct shall be done by clean dry air from pressurization system using air supply from plant compressed air system or dedicated compressor/blower. The system shall be suitable to ensure air leakage of not more than 5% of total enclosure volume per hour. System shall be complete with control and instrumentation, safety features, dryers, filters, blowers etc., after installation at site.	Pressurisation System The pressurization of the busduct shall be done by clean dry air from pressurization system using air supply from plant compressed air system or dedicated compressor/blower. System shall be complete with control and instrumentation, safety features, dryers, filters, blowers etc., after installation at site.
49	VI/B	Sub section A2	4 of 12	1.02.00 (h) point no.4	A common oil retention pit per unit shall be provided to hold oil quantity of the largest transformer (by volume) & 10 minutes of water quantity of HVW spray system for the largest transformer.	A common oil retention pit per unit or for both the unit shall be provided to hold oil quantity of the largest transformer (by volume) & 10 minutes of water quantity of HVW spray system for the largest transformer.
50	**VI PART -E**	**SLD**			**9915-999-POE-J-002 Rev No B Single line Diagram-STG Package**	**9915-999-POE-J-002 Rev No C Single line Diagram-TURBINE GENERATOR AND ASSOCIATED PACKAGES**
51	**VI/B**	**B-15**	**20 of 36**	**1.11.07**	**Note vi)** **During Infra red thermography test of GT, the temperature of any part of tank shall be limited to 85 deg C.	**Note vi)** **During Infra red thermography test of GT, the temperature of any part of tank shall be limited to 110 deg C.

52	Part B, Section – VI	Sub-section E-47, Civil Works	6 of 24	6.6.0	Structural steel and Reinforcement steel supply if in the scope of the contractor shall be procured from Main Steel Producers. Currently, Main Steel producers considered as acceptable are SAIL, JSW Steel Ltd, Jindal Steel & Power, Tata steel Ltd. (for Reinforcement steel/TMT bars), RINL (for long products/Rolled sections and Reinforcement steel/TMT bars), Essar Steel India Ltd. (for Flat products/ Steel Plates), Electrosteel steel Ltd. (for Reinforcement steel/TMT bars) and Monnet Ispat and Energy Ltd. (for long products/Rolled sections and Reinforcement steel/TMT bars). Subsequently, if any new Main Steel Producer/s are proposed during execution of the contract, they may be considered for acceptance after an assessment.	Structural steel (plates and rolled sections i.e. channels, beams & angles) and Reinforcement steel supply if in the scope of the contractor shall be procured from Primary Steel Producers (Refer NOTE below). Currently, Primary Steel Producers acceptable are SAIL, JSW Steel Ltd, Jindal Steel & Power, Tata steel Ltd. (for Reinforcement steel/TMT bars), RINL (for long products/Rolled sections and Reinforcement steel/TMT bars), Essar Steel India Ltd. (for Flat products/ Steel Plates), Electrosteel steel Ltd. (for Reinforcement steel/TMT bars) and Monnet Ispat and Energy Ltd. (for long products/Rolled sections and Reinforcement steel/TMT bars). Subsequently, if any new Primary Steel Producer/s are proposed during execution of contract, the same may be considered for acceptance subject to meeting the following qualifying requirements: i) The proposed supplier should be a Primary Steel Producer, having a minimum production capacity of one million tons per annum (MTPA). ii) The proposed supplier should be a regular manufacturer of Steel Plates and / or Rolled Sections and / or Reinforcement Steel for the last two years as on date of submission of proposal. iii) The proposed supplier should also be a registered licensee with Bureau of Indian Standards for BIS:1786/2062 at the time of submission of proposal. NOTE: The “Primary Steel Producer” shall mean Steel Producer of any capacity, irrespective of process route, starting their operations from iron making using iron ore, virgin or processed, with necessary refining facilities and rolling/processing facilities, at a single location or else in multiple locations provided that the entire gamut of iron & steel production, from iron making to finished steel production, is owned by the same company or its subsidiary company(ies). Provided that the iron making capacity is sufficiently matching the steel making capacity. Further, downstream units should use material from the upstream units of the same company or its subsidiaries. In case of non-availability of certain steel section/s i.e. Angle smaller than 100x100x10 mm, MS flats, rounds, square bars and chequered plate from primary steel producers, an option is given to the Main contractor to source these sections directly from SAIL

						Conversion/Wet Leasing agent subject to the conditions given at point no. A) below: A) Approval conditions for procurement of structural steel sections through SAIL Conversion/Wet Leasing agent: 1. Main Contractor to ensure continuity of BIS license of the manufacturer for the sections being manufactured for Owner supply. 2. Billets shall be procured from Owner approved Main Steel Producers. Proper records for traceability from raw material to final product shall be maintained. 3. 100% chemical analysis of the raw material (Billets) shall be carried out as per IS: 2830. Testing of one sample per 40 MT for each type of section or part thereof shall be carried out as per IS: 2062 on finished product. 4. Each lot of delivery of finished product shall be accompanied with co-relatable Manufacturer's Test Certificate (MTC). MTC of finished sections shall be correlated with original MTC for Billets received from Main Steel Producer and Manufacturer Test Report of chemical analysis of Billets mentioned at point no.3. MTC of finished sections shall include the reference of MTC for Billets from Main Steel Producer. 5. Owner will have access to carry out the surveillance checks for in-process stage. 6. In case of any defects are seen in the material, Main Contractor will replace the material without any cost implication to Owner. In case of non-availability of certain size/s of steel tubes conforming to IS:1161 and Hollow (square and rectangular) steel sections conforming to IS: 4923 from primary steel producers, the same may be sourced from BIS approved sources having valid BIS license subject to the conditions given at point no. B) below: B) Approval conditions for procurement of Steel tubes conforming to IS: 1161 and Hollow (square and rectangular) steel sections conforming to IS: 4923 from BIS approved sources: 1. Main Contractor to ensure continuity of BIS license of the manufacturer for the sections being manufactured for Owner supply. 2. Raw materials shall be procured from Owner's approved Main Steel Producers.

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>3. 100% chemical analysis of the raw material (steel) shall be carried out as per IS: 228. Testing of samples of steel tubes and hollow sections from each lot shall be carried out as per IS: 1161 & IS: 4923 respectively on finished product.
4. Each lot of delivery of finished product shall be accompanied with co-relatable Manufacturer's Test Certificate (MTC).
5. Owner will have access to carry out the surveillance checks for in-process stage.
6. In case of any defects are seen in the material, Main Contractor will replace the material without any cost implication to Owner.

The specific methodology to be followed for procurement of Structural Steel and Reinforcement Bars through conversion route/BIS approved sources route shall be subject to approval by Owner in advance.</td></tr>
<tr><td>53</td><td>Part B, Section – VI</td><td>Sub-section E-47, Civil Works</td><td>14 of 24</td><td>11.1.5.9</td><td><table><tr><td>SL. NO.</td><td>TESTS/CHECKS</td><td>QUANTUM/STANDARD</td></tr><tr><td>2</td><td>Ultrasonic test on plates above 40mm</td><td>As per ASTM A435</td></tr></table></td><td><table><tr><td>SL. NO.</td><td>TESTS/CHECKS</td><td>QUANTUM/STANDARD</td></tr><tr><td>2</td><td>Ultrasonic test on plates above 40mm</td><td>As per ASTM –A578 level B-S2</td></tr></table></td></tr>
<tr><td>54</td><td>Part B, Section – VI</td><td>Sub-section E-47, Civil Works</td><td>11 of 24</td><td>11.1.4 (last line of 5th paragraph)</td><td>Sample test for 3% of the number of mechanical bars grips subject to a minimum of three, shall be carried out up to the yield strength of reinforcement of bars.</td><td>Deleted</td></tr>
</table>

55	Part C, Section – VI	GTR	37 of 89	9.02.23	All solid state electronic system / equipment / sub assembly shall be free from infant mortile components. For establishing the compliance to this requirement, the contractor / sub - contractor should meet the following. 1.The Contractor / Sub - contractor shall furnish the established procedure being followed for eliminating infant mortile components. The procedure followed by the Contractor / Sub - contractor should be substantiated along with the statistical figures to validate the procedure being followed. The necessary details as required under this clause shall be furnished at the stage of QP finalization. Or In case the Contractor / Sub - contractor do not have any established procedure to eliminate infant mortile components then two or 10% whichever is less, most densely populated Panels shall be tested for Elevated Temperature Cycle Test as per the following procedure. **Elevated Temperature Test Cycle** During the elevated temperature test which shall be for 48 hours, the ambient temperature shall be maintained at 50° C. The equipment shall be interconnected with devices and kept under energized conditions so as to repeatedly perform all operations it is expected to perform in actual service with load on various components being equal to those which will be experienced in actual service. During the elevated temperature test the cubicle doors shall be closed (or shall be in the position same as they are supposed to be in the field) and inside temperature in the zone of highest heat dissipating components / modules shall be monitored. The temperature rise inside the cubicle should not exceed 10° C above the ambient temperature at 50° C. In case of any failure during the test cycle, the further course of action should be mutually discussed for demonstrating the intent of the above requirement. **Burn in Test Cycle** The test shall be conducted on all the panels fully assembled and wired including the panels having undergone the above mentioned elevated temperature test.	1- Environmental stress screening test process / procedure for eliminating infant mortile components for DDCMIS / PLC based system & for other systems having substantial electronics components (as determined by employer) like Electronic transmitter, CCTV components, PA systems etc. shall be furnished for owner acceptance

					The period of Burn in Test Cycle shall be 120 hrs and process shall be similar to the elevated temperature test as above except that the temperature shall be reduced to the ambient temperature prevalent at that time. During the above tests, the process I/O and other load on the system shall be simulated by simulated inputs and in the case of control systems; the process which is to be controlled shall also be simulated. Testing of individual components or modules shall not be acceptable. During the Burn in Test the cubicle doors shall be closed (or shall be in the position same as they are supposed to be in the field) and inside temperature in the zone of highest heat dissipating components / modules shall be monitored. The temperature rise inside the cubicle should not exceed 10° C above the ambient temperature.	
56	Part C, Section – VI	GTR		9.02.25 New clause added		**Software Reliability / Quality Certification** Certification from OEM's authorized signatory that software offered with DDCMIS, PLC, CCTV, PA, Pyrometer, CEMS, AAQMS, EQMS, BHMS etc. declaring that the all the offered software(s) had gone through the established software quality test and offered software is not of β-version and offered software is also free from all known bugs as on date of approval of systems documents by THDC as a part of quality documentation review and approval process during detail engineering.
57	VI/B	E-13	1-12		Generator & Auxiliaries QA requirement table rev-11	Generator & Auxiliaries QA requirement table rev-13(Attached)

<table>
<tr><td>58</td><td>VI/B</td><td>A10</td><td>1 of 37</td><td>1.05.00</td><td>a) Centralized air conditioning system Control Rooms, Control Equipment Rooms, UPS & battery charger room, SWAS room, Water Analysis Lab, static excitation control room (if applicable) etc. in TG building. Dedicated AHUs shall be provided for each static excitation control room and shall be placed near to it.</td><td>a) Centralized air conditioning system Control Rooms, Control Equipment Rooms, UPS & battery charger room, SWAS room, Water Analysis Lab, static excitation control room (if applicable) etc. in TG building. Dedicated AHUs shall be provided for each static excitation control room and shall be placed near to it. Further, the equipment heat load of C&I systems/equipments (Employer's Scope) may be considered as follows:
<table>
<tr><th>Sl. No.</th><th>Area</th><th>Equipment Heat Load</th></tr>
<tr><td>i.</td><td>CCR</td><td>20kW</td></tr>
<tr><td>ii.</td><td>CER at operating floor</td><td>72kW per unit</td></tr>
<tr><td>iii.</td><td>CER at mezzanine floor</td><td>27kW per unit</td></tr>
<tr><td>iv.</td><td>UPS & Battery Charger Room</td><td>54kW per unit</td></tr>
</table></td></tr>
<tr><td>59</td><td>VI/B</td><td>A10</td><td>1 of 37</td><td>1.05.00</td><td>b) Centralized air conditioning system for Service Building: Various office areas, entrance lobbies, visitor & VIP lounge, reception area, simulator area, etc.</td><td>b) Centralized air conditioning system for Service Building: Various office areas, entrance lobbies, visitor & VIP lounge, reception area, etc.</td></tr>
<tr><td>60</td><td>VI/B</td><td>A11</td><td>10 of 25</td><td>3.10.00</td><td>h) Where ever horizontal ducts are running outside …… supporting the duct work with the Employers beam & columns shall be provided by the bidder.</td><td>----------DELETED----------</td></tr>
<tr><td>61</td><td>VI/B</td><td>A11</td><td>2 of 25</td><td>2.00.00</td><td>Note: Dry bulb temperature during summer season is 45.0 degC. The criteria which gives higher number of air changes/higher quantity of air of either of condition (Cl. 2 or 3) flow shall be selected.</td><td>Note:
1. Dry bulb temperature during summer season is 45.0 degC. The criteria which gives higher number of air changes/higher quantity of air of either of condition (Cl. 2 or 3) flow shall be selected.
2. To calculate air quantity based on air changes per hour (ACPH) method, height of operating floor (17M) in AB Bay shall be taken as 4 meter.</td></tr>
</table>

<table>
<tr><td rowspan="3">62</td><td rowspan="3">VI/B</td><td>A10
A11</td><td>16 of 37
9 of 25</td><td>6.05.04 d)
3.10.00 c)</td><td>Where the sheet metal …… double layer asbestos/canvas or neoprene coated fibre glass.</td><td>Where the sheet metal …… double layer canvas or neoprene coated fibre glass.</td></tr>
<tr><td>A10

A11</td><td>35 of 37

23 of 25</td><td>Annexure-III

Annexure-III</td><td>I. Data Sheet for Water Line Gate/Sluice Valves:
<table><tr><td>7.6</td><td>Packing</td><td>Graphited Asbestos</td></tr></table>I. Data Sheet for Water Line Gate Valves:
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<table><tr><td>7.6</td><td>Packing</td><td>Non-Asbestos</td></tr></table>I. Data Sheet for Water Line Gate Valves:
<table><tr><td>7.6</td><td>Packing</td><td>Non-Asbestos</td></tr></table></td></tr>
<tr><td>A10

A11</td><td>36 of 37

24 of 25</td><td>Annexure-III

Annexure-III</td><td>II. Data Sheet for Globe Valves:
<table><tr><td>7.6</td><td>Packing</td><td>Graphited Asbestos</td></tr></table>II. Data Sheet for Globe Valves (as applicable):
<table><tr><td>7.6</td><td>Packing</td><td>Graphited Asbestos</td></tr></table></td><td>II. Data Sheet for Globe Valves:
<table><tr><td>7.6</td><td>Packing</td><td>Non-Asbestos</td></tr></table>II. Data Sheet for Globe Valves (as applicable):
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<tr><td></td><td></td><td>A10

A11</td><td>37 of 37

25 of 25</td><td>Annexure-III 6.0

Annexure-III 6.0</td><td>III. Data Sheet for Check Valves:
<table><tr><td>d)</td><td>Gaskets</td><td>---</td><td>Compressed Asbestos Fibre</td></tr></table>III. Data Sheet for Check Valves:
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<table><tr><td>d)</td><td>Gaskets</td><td>---</td><td>Non-Asbestos</td></tr></table>III. Data Sheet for Check Valves:
<table><tr><td>d)</td><td>Gaskets</td><td>---</td><td>Non-Asbestos</td></tr></table></td></tr>
</table>

63	VI/B	A3	69 of 92	6.08.14	**Operational Requirements:** (a). Drive turbine of BFP …… …… (d) …… of running auxiliaries.	**Operational Requirements:** (a). Drive turbine of BFP …… …… (d) …… of running auxiliaries. (e) TDBFP center line elevation shall be such that the drains shall not be routed below zero meter elevation. Drain shall flow by gravity to turbine flash tank and there should not be any loop in the drain.
	VI/B	A3	23 of 92	1.20.00 (h)	(h) Provide separate oil system with 100% redundant pumps, motors, accumulators and control cubicles etc. for both HP and LP bypass systems. Accumulators shall be sized to take sufficient number of stroking operations of all actuators under a condition of loss of oil supply from the pumps.	(h) Provide separate oil system with 100% redundant pumps, motors, accumulators and control cubicles etc. for both HP and LP bypass systems. Accumulators shall be sized to take sufficient number of stroking operations of all actuators under a condition of loss of oil supply from the pumps. Alternatively, Bidder may also provide common oil system with 100% redundant pumps, motors, accumulators and control cubicles etc. for HP and LP bypass systems. In case of common oil system, oil piping layout shall be as per recommendation of valve manufacturer and separate accumulators located nearer to respective valves shall be provided for HP and LP bypass system. Accumulators shall be sized to take sufficient number of stroking operations of all actuators under a condition of loss of oil supply from the pumps. Mandatory spares shall necessarily be supplied separately for both HP bypass oil system and LP bypass oil system as specified elsewhere in the specification.
64	VI/A	A0	6 of 13	Annexure-II	Annexure-II	Refer revised Apendix-II.

7.00.0	**FOUNDATION SYSTEM AND GEOTECHNICAL DATA**
7.01.0	**Soil Data** Owner has carried out preliminary geotechnical investigation in the proposed area. Available bore logs of the area along with laboratory test results are enclosed at Annexure-C for Bidder's reference. The geotechnical investigation report of this area will be made available for the Bidder's study at the Owner's office, if required. However, Contractor, on his own cost, would have to conduct detailed investigations during execution to get the design data for carrying out foundation designs. No extra payment or claim for carrying out these additional investigations shall be entertained on this account. Based on the available bore logs, the soil stratum consists of sandy silt/clayey silt of low plasticity layer varying from 1.5m to 5m depth from ground level followed by silty sand/fine sand layer of thickness varying from 20m to 30m. This layer is underlain by about 5m layer of sandy silt followed by silty sand/fine sand layer up to the depth of investigation. The ground water table is encountered at about 4m depth at the time of investigation and may fluctuate with seasonal variation. **Based upon the initial assessment, soil up to a depth of 5m to 6m (below existing ground level) is prone to liquefaction hazard. Suitable ground improvement as specified in subsequent clauses shall be carried out if open foundations (for lightly loaded structures) and pile foundation (for heavily loaded structures) are to be founded/cut-off-level (COL) of piles is to be kept in liquefiable zone. However, in case Contractor wants not to carry out ground improvement, minimum founding level/COL of piles shall be below 5m below NGL or below liquefiable zone whichever is deeper. For heavily loaded structures, pile foundations may be considered and for lightly loaded structures, suitable ground improvement as per clause 7.02.04 & 7.02.05 may be considered**. Minimum cut off level below NGL is 5m. Onus of correct assessment/ interpretation and understanding of the existing subsoil condition / data is on the Bidder. Bidder may refer topographical survey drawing for variation in existing ground level (EGL) and FGL. As per topographical survey drawing, NGL is varying from RL(+) 191.5m to RL(+) 193.5m and FGL is RL(+) 194.0 i.e. there may be filling of 0.5m to 2.5m.
7.01.01	Since the available geotechnical data is preliminary only, the Contractor shall carryout his own detailed geotechnical investigation for facilities under this package and shall be as per the scheme approved by Owner**.** The scheme for geotechnical investigation shall be as given at Clause 7.07.00 and shall be approved by Owner before execution. Geotechnical investigation work shall be got executed by the Contractor through the agencies as mentioned in Clause No. 7.07.03. However, no time extension shall be given on account of detailed geotechnical investigation carried out by the Contractor during execution. Bidder needs to consider the time required for detailed geotechnical investigation work in the L2 schedule which shall be binding on the Contractor during execution. The geotechnical investigation report shall be prepared with detailed recommendations regarding type of foundation and allowable bearing pressure/pile capacities for various structures/ facilities and other soil parameters. The report shall be submitted for Owner's approval incorporating all comments of owner, prior to commencement of design of foundation.
7.01.02	**The furnished borelog details are specific to the co-ordinates where the boreholes have been carried out and are provided for bidder's information only. Soil profile in the proposed area may vary with respect to the borelogs enclosed for bidder's**

information. Bidder has to consider all such variations in his estimation, over the extent of the work to be carried out. The Bidder should note that nothing extra whatsoever on account of variation between geotechnical data collected by Owner and that found by the Bidder during geotechnical investigation by him or during execution of works, shall be payable.

7.01.03 Tank Foundations

a) The tanks shall rest on flexible tank pad foundation, resting on sand with concrete ring wall to retain sand. Base of the concrete ring wall shall not rest on the expansive soil, if any.

b) Entire loose/ soft soil inside the concrete ring wall shall be removed and shall be filled with sand. Sand for filling shall be clean and well graded conforming to IS 383 with grading Zone I to III.

c) Sand shall be spread in layers not exceeding 30cm compacted thickness over the area. Each layer shall be uniformly compacted by mechanical means like plate vibrators, small vibratory rollers, etc to achieve a relative density of not less than 80%.

d) Other requirements of tank foundations shall be as per IS 803 and as specified elsewhere in the specifications.

7.02.00 **Foundation System**

The requirements for the foundation system to be adopted are as given in subsequent clauses. Depending upon the depth of competent strata/stratum, type of structures, functional requirement of facility, extent of cutting / filling, suitable foundation, open or pile shall be adopted with approval of owner. For heavily loaded structures, pile foundations may be considered and for lightly loaded structures, suitable ground improvement may be considered.

7.02.01 General Requirements

a) All structures/equipment shall be supported either on suitable open foundations (isolated, combined, raft) or on pile foundation depending on type of structures/facilities, sub-strata, topography etc.

b) The roads, ground floor slabs, trenches, pipe pedestals except thrust blocks, channels/drains and staircase foundation with foundation loading intensity less than 4 T / M^2 may be supported on open / shallow foundations resting on virgin / controlled compacted filled up soil. If the encountered sub-strata is black cotton soil, the same shall be either replaced upto the full depth or black cotton soil shall be stabilized by suitable treatment. For mitigation of liquefaction separate clause may be referred.

c) No other foundation (other than as mentioned in (b) above and (h) below) shall rest on the filled up ground / soil.

d) All foundations shall be designed in accordance with relevant parts of the latest revisions of Indian Standards.

e) Bidder shall also ensure that there is no damage to existing nearby foundations and the foundations pertaining to this package are not placed at shallower depth than the nearby foundations. If required depth of foundation is deeper than the existing foundations, proper protection shall be provided to existing foundations.

f) The water table for design purpose shall be considered at Finished Ground Level.

g) A combination of open and pile foundations shall not be permitted under the same equipment / structure / building.

h) Foundation for miscellaneous equipment's on ground floor with sand backfilling.

For equipments of static weight upto 1.5 T, the equipment may be supported on the ground floor slab by locally thickening the slab. Thickening of the ground floor slab shall be done upto an extent of about 0.6 m beyond the plan area of the equipment on all the sides. Further, the load intensity below the equipment shall be limited to 4T/m2. Other requirements of floor slab and compaction below the floor slab shall be adhered, as specified elsewhere in the specifications.

For equipment's of static weight between 1.5 T and 20 T, the equipment may be supported on compacted sand filling with the load intensity below the equipment limited to 4T/m2. The minimum depth of foundation is 1.0m below FFL. Other requirements of sand compaction below the foundation shall be adhered, as specified elsewhere in the specifications.

For equipment of static weight more than 20 T, the equipment foundation shall be taken to the founding level or shall be built up with PCC from the level as per approved report. The pedestal of equipment foundation or the foundation Block shall be isolated from the adjoining floor slab by providing bitumen impregnated fiber board of minimum 50 mm thick, conforming to IS: 1838 all around the equipment pedestal for the full depth of the floor slab.

7.02.02 Open Foundations

Following structures are to be placed on open foundation:

Offsite buildings & structures, CPU, entire Transformer yard area enclosed between the peripheral road (except transformer foundations) and all other structures which are not founded on pile foundation are to be placed on open foundation and if the depth of foundation is less than 5.0/6.0m (as per approved report) below the EGL than the ground improvement shall be done using stone columns as per clause 7.02.04.

In case open foundations are adopted, following shall be adhered to.

a) The minimum width of foundation shall be 1.0 m.

b) Minimum depth of foundation shall be 1.0m below Ground Level.

c) It shall be ensured that all foundations of a particular structure/ buildings/ facility shall rest on one bearing stratum.

d) Wherever the intended bearing sub-strata is virgin soil stratum but the actual stratum encountered during foundation excavation consists of filled up soil at founding level, under such cases either the foundation shall be lowered completely into the virgin

stratum or the filled up soil upto the virgin layers shall be removed and built up through PCC (1:4:8) up to designed foundation level.

e) Wherever the intended bearing stratum is weathered rock, but the actual strata encountered during excavation consists of both overburden soil and weathered rock at founding level, under such cases, the overburden upto the weathered rock level including 0.5 m into the weathered rock shall be removed and built up through PCC (1:3:6) upto the designed founding level. Thus, maintaining the same founding level for all the footings of a structure. The treatment at the base of foundation before laying the PCC shall be carried out as per IS: 12070.

f) The last layer of about 300 mm before reaching the founding level shall be excavated carefully by such equipment so that soil / rock at the required level will be left in its natural condition.

g) If joints, fissures or other discontinuities in rock are encountered at founding level, then treatment of such rock defects shall be carried out as per IS: 13063-1991 in consultation with the Engineer.

h) During design, the Allowable Bearing Pressure shall be adopted after approval of geotechnical investigation report. The ground improvement scheme shall be approved by owner before execution. Contractor, during execution, has to consider the geotechnical data required for design of foundation based on the detailed investigations to be carried out by them. An adequate factor of safety as per the Standards and also as per the industry practice shall be inbuilt in the civil design of foundations in order to cover up the risks of unforeseen conditions which may arise later. It is to be noted that no additional payment or claim of the Contractor, whatsoever, shall be admissible on account of variation in geotechnical parameters from the bid values, variation of foundation design and variation of construction methodology of foundation construction.

For NGL of the proposed area GLP along with topographical survey drawing & borelog data may be referred. In case any loose/soft pockets is encountered at founding level, the same shall be removed completely upto the hard strata and filled up with PCC (1:4:8).

i) For open foundations, the total permissible settlement shall be governed by IS: 1904 / IS: 13063 and from functional requirements whichever is more stringent. However, total settlement shall be restricted to the following:

Isolated & Raft (Main Power House, TG) resting on soil	25 mm
Isolated & Strip (other than Main Power House, TG) resting on soil	40 mm
Raft (other than Main Power House, TG) resting on soil	75 mm

7.02.03 Pile Foundations – In case piles are adopted, following shall be adhered to :

Following structures are to be placed on pile foundation:

Main Power house including Control room, TGs, Service Building, Transformer foundations, Pipe cable gallery, any other heavily loaded structure etc.

i) pile foundation shall be of RCC, Cast-in-situ bored piles as per IS:2911. Pile boring shall be done using Rotary Hydraulic Rigs. Two stage flushing of pile bore shall be ensured by airlift technique duly approved by the Employer. If required, temporary or permanent MS liner may be provided for piling

(ii) The minimum diameter of pile shall be 600 mm. The allowable load capacity of the pile in different modes (vertical compression, lateral and pullout) shall be based on the approved detailed geotechnical investigation tests to be carried out during design stage and shall be least of the two values i.e. as per approved geotechnical report and pile capacity achieved in pile load tests. It is to be noted that no additional payments or the claim of the Contractor, whatsoever, shall be admissible on account of variation in geotechnical parameters from the bid values, variation of foundation design and variation of construction methodology of foundation construction.

iii) Only straight shaft piles shall be used. Minimum cast length of pile above cutoff level shall be 1.0 m.

iv) The contractor shall furnish design of piles (in terms of rated capacity, length, diameter, termination criteria to locate the founding level for construction of pile in terms of measurable parameter, reinforcement for job as well as test piles, pile load test arrangement, locations of initial test piles etc.) for Engineer's approval.

v) The piling work shall be carried out in accordance with IS:2911 (Relevant part) and accepted construction methodology. The construction methodology shall be submitted by the Contractor for Engineer's approval.

vi) Number of initial load tests to be performed for each diameter and rated capacity of pile shall be subject to minimum as under.

Vertical	
Lateral	Minimum of 2 Nos. in each mode.
Uplift	

vii) The initial pile load test shall be conducted with test load upto three times the pile capacity as finalized in (ii) above. In case of vertical compression test (initial test) the method of loading shall be cyclic as per IS:2911 (relevant part).

viii) Load test shall be conducted at pile Cut-off Level (COL). If the water table is above the COL the test pit shall be kept dry throughout the test period by suitable de-watering methods. Alternatively the vertical load test may be conducted at a level higher than COL. In such a case, an annular space shall be created to remove the effect of skin friction above COL by providing an outer casing of suitable diameter larger than the pile diameter.

ix) Number of routine pile load tests to be performed for each diameter/allowable capacity of pile shall be as under :

i) Vertical : 0.5% of the total number of piles provided.

ii) Lateral : 0.5% of the total number of piles provided.

x) The routine tests on piles shall be conducted upto test load of one and half times the allowable pile capacity. Piles for routine load tests shall be approved by the Employer.

xi) In case, routine pile load test shows that the pile has not achieved the desired capacity or pile(s) have been rejected due to any other reason, then the Contractor shall install additional pile(s) as required and the pile cap design shall accordingly be reviewed and modified, if required.

xii) Testing of piles and interpretation of pile load test results shall be carried out as per IS:2911 (Part-4). Contractor shall ensure that all the measuring equipment and instruments are properly calibrated at a reputed laboratory / institute prior to their use. Settlement / movement of the pile top shall be made by Linear Variable Differential Transducers (LVDT) having a least count of 0.01mm.

xiii) The test load on initial test piles shall be applied by means of reaction from anchor piles / rock anchors alone or combination of anchor piles / rock anchors and kentledge with concrete blocks.

xiv) Low Strain Pile Integrity test shall be conducted on all test piles and job piles. This test shall be used to identify the routine load test and not intended to replace the use of static load test. This test is limited to assess the imperfection of the pile shaft and shall be undertaken by an independent specialist agency to be approved by Engineering department of Owner. The test equipment shall be of TNO or PDI make or equivalent. The process shall confirm to ASTM.

xv) High Strain Dynamic Load Test may be carried out for routine load testing of working piles. However, at least two numbers of static routine vertical load tests shall be carried out on pile on which high strain dynamic load test has already been carried out for establishing the correlation between the two tests. In case of discrepancy if any between dynamic and static vertical load tests, then additional static routine vertical load tests shall be conducted as decided by the Engineer and the results of static routine vertical load shall prevail. Number of routine vertical pile load tests as per clause 7.02.03 (ix) shall be total of static routine vertical load test and high strain dynamic load tests.

The procedure to carry out the test shall be submitted to the Engineer. The test and equipment shall conform to ASTM D4945-00. The test shall be conducted by an experienced independent test agency approved by the owner. Field data shall be submitted to the site engineer and shall include force velocity curves, pile capacity, simulated static load test curve, net and total pile displacement, pile integrity. A (Case pile wave analysis) CAPWAP or equivalent software analysis shall be conducted on the field data for correct capacity estimation and to evaluate end bearing and skin friction components of the pile.

xvi) From load considerations, single pile may be used under a column/tower. In that case, pile shall be connected with tie beams at pile cut off level in both directions.

xvii) Contribution of frictional resistance of filled up soil if any, shall not be considered for computation of frictional resistance of piles.

xviii) Reinforcement for job piles shall be designed as following:

(a) Compression + bending piles: For these piles, the allowable safe pile capacities in compression and bending shall be considered.

(b) Tension + bending piles: For these piles, the actual pile forces to be considered. However, maximum 3 types of combinations for varying percentage of tension capacity + bending case may be designed & adopted by contractor for the entire scope of work under this package.

7.02.03 **Ground Improvement below structures/facilities using stone columns:**

i) The work broadly involves installation of stone columns for mitigation of liquefaction hazard, improvement in bearing capacity of the soil and to bring down the residual settlements so that the facilities that may be constructed over the stone column area shall stand safely and perform satisfactorily throughout their lifetime.

The stone columns shall be installed using bottom/top feed Vibroflotation techniques **without water jetting** i.e. dry method (displacement method) in accordance with these specifications. Installation of stone column by rammed/driven technique **without water jetting** may also be permitted/used subject to conforming to the specification and meeting to the construction schedule.

In case of vibro replacement method, the bidder shall submit the construction methodology giving information regarding details of equipment, type and energy rating of vibratory probe, details of power output, compaction criteria etc.

In case of rammed stone column methodology, the bidder shall submit the construction methodology giving information regarding type of equipment, weight of rammer, height of fall, compaction criteria, stages of casing withdrawal etc. Use of bentonite slurry for formation of stone columns shall not be permitted. A casing pipe shall be provided by the bidder upto to full depth of stone column.

In either of the above techniques adopted, the parameters shall be so chosen to give stone column of specified diameter and load carrying capacity.

In either of the above techniques adopted, the quantity of stones shall be placed in such that the column is filled in stages of height not exceeding 1m. Each stage shall be compacted to ensure uniform consumption of stones throughout the depth.

The method of placement of stone shall be such that it is possible to measure the total consumption of stones in a column.

Stone column installation procedure submitted by the bidder shall be approved by the Engineer.

ii) All materials and workmanship shall be in accordance with this specification and IS: 15284: Part 1: 2003."Design and Construction for Ground Improvement – Guidelines, Part 1 Stone Columns".

iii) Case:1 Ground improvement without piling provision after it

Dia of column (D) = 900mm
Spacing = 3D (Triangular pattern)
Depth of ground improvement (d) = 6m

Case:2 Ground improvement with piling provision after it

Dia of column (D) = 900mm
Spacing = 4D (Rectangular pattern)
Depth of ground improvement (d) = 6m

iv) Ground improvement with stone column shall be carried out minimum d/2 distance beyond the footprint of buildings(minimum 2 rows beyong the building footprint), where d is the depth of improvement. The ground improvement shall be carried out below the entire building/structure rather than restricting it to just below the foundations.

v) Initial load tests shall be performed at the trial site as identified by Engineer to evaluate load settlement behaviour of the stone columns. These tests shall be conducted on a single as well as on a group of three columns. Load testing procedure, equipment and interpretation shall confirm to IS 15284 (Part-I).

vi) Boreholes shall be drilled prior and after the installation of stone columns and frequency shall be minimum 1 borehole under each structure/facility or 2000 Sqm whichever is less. The performance of the stone column(s) shall be considered acceptable and approved by the Engineer based on the SPT 'N' values of the improved ground.

The installation of stone column is considered acceptable if it achieve SPT 'N' value more than 15 from the natural ground level upto depth of improvement. The minimum load intensity after ground improvement shall be as mentioned in table-1 of this specification.

7.02.05 **Ground Improvement below roads & drains:**

In order to mitigate liquefaction below roads & drains, ground improvement by dynamic compaction or any other method can be done. The improvement shall be done along the alignment & additional d/2 distance on both sides away from the road/drain footprint, where d is depth of treatment. Boreholes shall be drilled prior and after the ground improvement and frequency shall be minimum 1 borehole under each structure/facility or 2000 Sqm whichever is less. The ground improvement is considered acceptable if it achieve SPT 'N' value more than 15 from the natural ground level upto depth of improvement. The minimum load intensity after ground improvement shall be 7T/m2. In case alignment of roads/drains changes at a later stage then the ground improvement using stone columns shall be done as per clause 7.02.04.

7.03.00 **Special Requirements**

7.03.01 Details of treatment for foundations / underground structures required to counteract soil / water chemical environment shall be as per detailed geotechnical investigation to be carried out by contractor. Contractor shall carry out chemical analysis during detailed geotechnical investigation and required treatment shall be provided accordingly.

7.04.00 **Excavation, Filling and Dewatering**

7.04.01	For excavation works, comprehensive dewatering with well point or deep wells arrangement, if required, shall be adopted. Scheme for dewatering and design with all computations and back up data for dewatering shall be submitted for the owner's information. The water table shall be maintained at 0.5m below the founding depth.
7.04.02	Excavation for shallow foundations shall be covered with PCC immediately after reaching the founding level. In case of **any local** loosening of soil or any loose pockets are encountered at founding level during excavation the same shall be removed and compensated by PCC M7.5. The final layer of about 300 mm thickness above the founding level shall be excavated by suitable means, so as to avoid disturbance to founding stratum.
7.04.03	**Backfilling in Main Power House and TG** This clause is applicable in the following areas: a) Main Power House Building foundations including Auxiliary column foundations, TG foundations, BFP foundations, CW pit, CEP Pit. b) Common control room building foundations (between the Main Power House Buildings) After construction of foundations for above mentioned buildings/ facilities, excavated earth between the excavation profile and the foundations, wherever backfilling is required, shall be backfilled with sand from founding level till finished ground level. In case block excavation is carried out for the above mentioned areas, after construction of foundations, whole area shall be backfilled with sand from founding level till finished ground level. Sand used for filling shall be natural sand/manufactured sand, and clean & well graded conforming to IS 383 with grading Zone I to III. Backfilling with sand shall be carried out in layers not exceeding 300 mm compacted thickness and each layer shall be compacted to minimum 80% of relative density. **Backfilling in other area** Backfilling around foundations, pipes, trenches, sumps, pits, plinths, etc. shall be carried out with approved material in layers not exceeding 300 mm compacted thickness (higher thickness of layers upto 500mm with heavy mechanical compacting equipment) and each layer shall be compacted to 90% of standard proctor density for cohesive soils and to 80% of relative density for non cohesive soils. In any case, black cotton soil shall not be used in back filling without providing cusion of 1m of non expansive cohesive soil/moorum around the footings. In case of roads in the area of black cotton soil, minimum 0.4m moorum shall be provided. Rock pieces having size less than 150 mm and interstices filled with soil may be used for backfilling around foundation, plinths etc. and shall be compacted to minimum of 85% of original stack of material after filling the interstices.
7.04.04	Founding level for trenches/channels shall be decided as per functional requirement. The bottom of excavation shall be properly compacted prior to casting of bottom slab of trenches / channels.
7.04.05	CBR tests for pavement/road design shall be carried out by the Contractor after earth filling (if applicable) has been completed upto the formation level.
7.04.06	The contractor shall take all necessary measures during excavation to prevent the hazards of falling or sliding of material or article from any bank or side of such excavation which is more

than one and a half meter above the footing by providing adequate piling, shoring, bracing etc. against such bank or sides.

Adequate and suitable warning signs shall be put up at conspicuous places at the excavation work to prevent any persons or vehicles falling into the excavation trench. No worker should be allowed to work where he may be stuck or endangered by excavation machinery or collapse of excavations or trenches.

7.05.00 Excavation in Rock- NA

Excavation in rock shall be carried out by mechanical means and if blasting is required for founding of some of the structures under this package, control blasting only shall be carried out.

7.06.00 Sheeting & Shoring

The contractor shall ascertain for himself the nature of materials to be excavated and difficulties, if any, likely to be encountered in excavation while executing the work. Sheet piling, sheeting and shoring, bracing and maintaining suitable slopes, drainage, etc. shall be provided and installed by the Contractor, to the satisfaction of the Engineer.

7.07.00 Geotechnical Investigation

The Contractor shall carry out detailed geotechnical investigation in the areas under his scope for establishing the sub-surface conditions and to decide type of foundations for the structures envisaged, construction methods, any special requirements/treatment called for remedial measures for sub-soil/ foundations etc. in view of soft sub-soils, aggressive sub-soils and water, expansive/swelling soils etc. prior to commencement of detailed design/drawings. The Contractor shall obtain the approval for the field testing scheme proposed by him from the Owner before undertaking the geotechnical investigation work.

7.07.01.00 **Scheme of geotechnical Investigation**

7.07.02.01 Field test shall include but not be limited to the following:

Boreholes, Standard Penetration Test (SPT), Dynamic Cone Penetration Test (DCPT), collection of disturbed samples (DS) and undisturbed soil samples (UDS), Trial Pits (TP), Plate Load Tests (PLT), Electrical Resistivity Test (ERT), Cross hole shear test (CHST), Pressuremeter test (PMT) In situ field permeability tests, collection of water samples, etc.

7.07.02.02 The diameter of borehole shall be minimum 150 mm in soil and 76 mm in rock. The diameter of UDS sampler shall be 100 mm minimum. Core drilling in rock shall be done by using hydraulically feed rotary drill & double tube core barrel with diamond bit.

7.07.02.03 The minimum tests are indicated in Clause No. 7.08.00. Adequate number of tests shall be conducted up to sufficient depth for complete determination of subsoil conditions. The depth of boreholes shall be as specified in Appendix A. SPT shall be carried out in all types of soil deposits and in all rock formations with core recovery up to 20%, met within a borehole. This test shall be conducted at every 3.0 m interval or at change of strata, up to the final depth. SPT 'N' of 100 and above shall be referred as refusal. UDS shall be collected at every 3.0 m interval or at change of strata up to depth of borehole. UDS may be replaced by additional SPT, if SPT'N' value in the strata is above 50.

7.07.02.04 Laboratory tests shall be done as per relevant IS codes. The laboratory tests, not be limited to the following shall be conducted on disturbed and undisturbed soil samples, rock samples & water samples collected during field investigations in sufficient numbers.

Laboratory Tests on Soil Samples

Laboratory tests shall be carried out on disturbed and undisturbed soil samples for Grain Size Analysis, Hydrometer Analysis, Atterberg Limits, Triaxial Shear Tests (UU), Natural Moisture Content, Specific Gravity and Bulk Unit Weight, Consolidation Tests, Unconfined Compression Test, Free swell Index, Shrinkage Limit, Swell Pressure Test, Chemical Analysis test on soil and water samples to determine the carbonates, sulphates, chlorides, nitrates, pH, organic matter and any other chemicals harmful to concrete and reinforcement/ steel.

7.07.02.05 Geotechnical investigation (field & laboratory) shall be carried out in accordance with the provisions of relevant Indian Standards.

On completion of all field & laboratory work, geotechnical investigation report shall be submitted for Owner's review/approval. The Geotechnical investigation report shall contain geological information of the region, procedure adopted for investigation, field & laboratory observations/ data/ records, analysis of results & recommendations on type of foundation for different type of structures envisaged for all areas of work with supporting calculations. Recommendations on treatment for soil, foundation, based on subsoil characteristics, soft soils, aggressive chemicals, expansive soils, etc.

Recommendations on foundation system and the net allowable bearing pressures and pile capacity shall be based on the conservative values of geotechnical investigation data.

7.07.03.00 Geotechnical investigation work shall be got executed by the Contractor through the following agencies.

1. C.E.TESTING COMPANY Pvt. Ltd, Kolkata
2. Cengrs Geotechnica Pvt. Ltd, New Delhi
3. M.K. Soil Testing Laboratory, Ahemdabad
4. KCT Consultancy Services, Ahemdabad

7.08.00 Geotechnical Investigation Scheme

a) **Boreholes (Minimum)**

S.No	Structure	Spacing/Number of borehole	Depth of borehole	Remarks
1	**Main power house, Turbo-Generator (TG)**	**35 to 45 m along the rows of main power house columns. Minimum 2 nos. boreholes under each TG**	**Depth of boreholes shall be 45 to 55m.**	**Depth of boreholes shall be as mentioned in column "Depth of**

2	**Service building**	**Minimum 3 nos. of boreholes**	**40 to 55 m**	**Borehole" or 5m continuous in rock with RQD > 50% whichever is earlier.**
3	**Transformer yard area**	**Minimum 8 nos. boreholes and 8 nos. of ERT**	**40 to 50 m**	
4	**Control room building**	**Minimum 3 nos. of boreholes, 3 Nos. ERT**	**40 to 55 m**	
5	**CPU**	**Minimum 2 nos. boreholes**	**25 to 35 m**	
6	**Condensate storage tank foundation.**	**3 Nos. boreholes, 3 Nos. ERT and 1 no PLT**	**25 to 35 m**	
7	**Pipe cable gallery**	**1 borehole @ 200m c/c spacing**	**40 to 55 m**	
8	**Other Structure/Facility**	**Minimum 2 Nos. boreholes under each area / facility**	**25 to 50 m**	

b) Other Field Tests (Minimum)

1	Plate Load Test (PLT)	Minimum 4 Nos	Test Depth from 2 to 4 m	
2	Cyclic Plate Load Test (CPLT)	1 no in each TG	Test Depth from 2 to 4 m	
3	Trial Pit (TP)	About 10 Nos.	Depth upto 4 m	
4	In Situ Permeability Test In Boreholes	In minimum 8 Nos. of boreholes	Tests shall be conducted at depths of 1.0m, 3.0m, 5.0m, 8.0m and 12.0m.	
5	DCPT	About 10-20% of boreholes up to refusal depth		

6	ERT	10 Nos other structures		
7	CROSS HOLE	1No. in each TG	Depths covering from 1.0 m to 25.0 m	
8	PMT	30 no of tests in main power house area	Depths covering from 1.0 m to 25.0 m	

- Depth and location of Boreholes and other field tests (DCPT, PLT, CPLT, CROSS HOLE TEST, PMT, TP, ERT, field permeability tests etc.) shall be approved by Owner before execution of geotechnical investigation work.

- Investigation in any other building / structure / facilities / trestles which are not mentioned above shall also be carried out, if required, by the bidder for the facilities under his scope.

Annexure-II

TABLE –B INTERIOR FINISHING SCHEDULE				
S.NO.	**DESCRIPTION OF AREA**	**FLOORING**	**WALLING**	**CEILING**
1.	Main power house Building.			
	a) Unloading Bay	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area
	b) Cable vault	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area
	c) Balance area including passage	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area
	d) SWAS Room	Vitrified ceramic tiles.	Acrylic emulsion paint.	Aluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	e) Equipment Area, ESP SWGR/ ACP Room/ UAF Room	Cement concrete with Metallic hardener topping	Acrylic distemper.	Acrylic distemper (except metal deck area
	f) UPS Battery charger room	Vitrified ceramic tiles.	Aluminium composite panel cladding	Aluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	g) Deaerator floor	Cement concrete with Metallic hardener topping.		-
	h) Operating Floor	20 mm thick heavy duty anti skid full body vitrified tile.	Colour coated Metal cladding on A-Row& Gable end, up to crane girder level.	Metal deck roofing (bottom of sheeting with RAL 9002 finish)

Annexure-II

TABLE –B INTERIOR FINISHING SCHEDULE				
S.NO.	**DESCRIPTION OF AREA**	**FLOORING**	**WALLING**	**CEILING**
	i) General circulation and movement areas	18mm thk. Polished granite honed finish combination as per design stone / marble stone/ Vitrified Ceramic tiles.		Acrylic distemper (except metal deck area).
	j) Switchgear room	Cement concrete with Metallic hardener topping.	Acrylic distemper	Acrylic distemper (except metal deck area)
	k) MCC Room	Cement concrete with Metallic hardener topping.	Acrylic distemper	Acrylic distemper (except metal deck area)
	l) Control room area including control room, computer room,	Matt Finish Vitrified ceramic tiles	Partition in fire rated glass with fire rated frames with 2 hr fire rating & Aluminium composite panel cladding for columns and walls	Alluminium false false ceiling in combination with GRG plaster board border in column depth or as per approved design
	m) Control equipment room,	Matt finish Vitrified ceramic tiles (Matt Finish) Partition	Partition in fire rated glass with fire rated frames with 2 hr fire rating & Aluminium composite panel cladding for columns and walls	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	n) Conference room, senior executive room.	Matt finish Vitrified ceramic tiles (Matt Finish)	Partition in fire rated glass with fire rated frames with 2 hr fire rating & Aluminium composite panel cladding for columns and walls	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design

Annexure-II

TABLE –B INTERIOR FINISHING SCHEDULE				
S.NO.	**DESCRIPTION OF AREA**	**FLOORING**	**WALLING**	**CEILING**
	o) Record room	Ceramic Tiles	Acrylic distemper.	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	p) Locker room	Ceramic Tiles	Acrylic Emulsion Paint	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	q) Toilet area	Ceramic tiles	Digitally glazed ceramic wall tiles up to False Ceiling Height	Calcium Silicate false ceiling.
	r) Office Room, Staff Room	Vitrified ceramic tiles.	Partition in fire rated glass with fire rated frames with 2 hr fire rating & Aluminium composite panel cladding for columns and walls	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	s) Laboratory area	Vitrified Ceramic / Acid/alkali resistant tiles.	Designer ceramic wall tiles up to False Ceiling Height/ Aluminium composite panel cladding for columns and walls in case of A.C Panel	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	t) RCC Stair case	18mm thick Granite (Polished and honed Finished) stone	Polished Granite Stone up to 1.2m. ht. & Acrylic Distemper Paint over wall putty finish for balance height.	Acrylic Distemper

Annexure-II

TABLE –B INTERIOR FINISHING SCHEDULE				
S.NO.	**DESCRIPTION OF AREA**	**FLOORING**	**WALLING**	**CEILING**
	u) Lift and Staircase Lobby	18mm thick polished granite stone as pattern.	18mm thick polished granite & glass mosaic tile cladding up to False Ceiling Height	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	v) Passages and general circulation areas.	18mm thick polished Marble Stone/ granite stone.	Acrylic Distemper / acrylic emulsion paint.	-
	w) Battery Room	Acid and alkali resistant tile.	Acid and alkali resistant tile up to 1.2m height and chemical resistant paint for balance height	Chemical Resistant paint except in locations where Metal deck has been provided
	x) Oil canal, oil room, oil purification Tank and other areas where oil spillage is likely to occur.	Oil resistant paint (epoxy based) 150 micron over primer.	As above except oil canal Oil resistant Paint	As above except oil canal.
	y) Pathways including roof area.	22mm thick concrete chequered tiles.	-	-
2.	Service Building			
	a) Entrance Lobbies and Lift areas/Foyer/Exhibition space.	18mm thick polished granite stone as/ pattern.	Textured paint /18mm thick polished granite cladding/lacquered glass cladding and glass mosaic tile murals in lift lobby & foyer	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design

Annexure-II

TABLE –B INTERIOR FINISHING SCHEDULE				
S.NO.	**DESCRIPTION OF AREA**	**FLOORING**	**WALLING**	**CEILING**
	b) Conference room, senior executive room.	11 mm thk. Laminated wooden flooring	Glazed partition with Aluminium frame/ Acrylic emulsion paint.	Mineral fiber board false ceiling in combination with GRG plaster board border in column depth or as per approved design.
	c) Office Room, Staff Room/Library/Canteen.	Digitally glazed Vitrified ceramic tiles.	Acrylic emulsion paint./ Designer Glass mosaic tile mural in combination with textured paint in Canteen	Mineral fiber board false ceiling in combination with GRG plaster board border in column depth or as per approved design
	d) Passage	Digitally glazed Vitrified ceramic tiles.	Acrylic emulsion paint.	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	e) RCC Stair case	18mm thick Granite (Polished and Flame Finished) stone	Glass Mosaic Tile cladding in murals and pattern	Acrylic Distemper.
	f) Toilet/ Pantry/ Kitchen	Ceramic tiles	Digitally glazed ceramic wall tiles up to False Ceiling Height	Acrylic distemper in kitchen / Calcium Silicate false ceiling in toilet and pantry
	g) AHU/ A.C. Plant room/MCC Room/Store	Cement concrete with Metallic hardener topping.	Acrylic distemper	Acrylic distemper
	h) Covered parking area	Pavers interlocking cement concrete blocks.	-	-
	i) Pathways including roof area.	22mm thick concrete chequered tiles.		

Annexure-II

Note :

1. All wall above false ceiling shall also be plastered.
2. The colour and pattern of finish shall be as per approved details.
3. All materials shall be of reputed and established brand approved by Engineer-in-charge.
4. Wherever alternative materials are specified, the final selection rests with Engineer-in-charge.
5. This finishing schedule shall also be applicable to similar functional areas for all other buildings and facilities.
6. All the finishing materials shall be applied/provided as per manufacturer specification and guidelines under the supervision & guidelines of manufacturer.
7. Requirement given above are suggestive and minimum. Bidder is welcome to suggest alternative scheme conforming to design functional requirement subject to approval of the Engineer-in-charge.

ISO/IEC 17025:2005
Certified Laboratory
(NABL)
Certificate No. T-1741

Soil Profile (BH-4)

Location : Khurja, U.P.
UTM Coordinates : 785926 E, 3118909 N
Termination Depth : 35.45 m (m)
Ground Water Depth : 5.50 m
Boring Method : Shell & Auger
Casing Depth : 32.0 m
Boring Start : 07-Jan-18
Boring Finish : 08-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Stiff grey sandy with gravels, low plastic (CL)																	
1.00	1.45	UDS1						16	23	55	6	29.4	18.0	11.4	1.89	1.67	12.6		UC		1.2		
2.00	2.45	SPT1	8	11																			
4.00	4.45	UDS2					5.00								1.89	1.67	13.2		DS	0.5 ,1, 1.5	0.0	32.4	
5.00	5.45	SPT2	14	15		Medium dense grey silty fine sand (SM)	7.00	0	84	16	0							2.67					
7.00	7.45	DS2				Medium dense to dense grey fine sand (SP-SM)																	
8.00	8.45	SPT3	17	16		- medium dense, 7.0 to 14.0 m																	
10.00	10.45	DS3																					
11.00	11.45	SPT4	23	21																			
13.00	13.45	DS4						0	92	8	0												
14.00	14.45	SPT5	36	31		- dense, 14.0 to 16.5 m																	
16.00	16.45	DS5					17.00																

[1] SPT is outside NABL scope.

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Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
17.00	17.45	SPT6	45	36		Dense to very dense brown silty fine sand (SM)																	
19.00	19.45	DS6				- dense, 17.0 to 23.0 m																	
20.00	20.45	SPT7	48	36																			
22.00	22.24	UDS3						0	84	16	0				2.00	1.75	14.5						
23.00	23.45	SPT8	59	42		- very dense, 23.0 to 29.0 m																	
25.00	25.45	DS7																					
26.00	26.35	SPT9	100/ 20cm	-																			
28.00	28.45	DS8																					
29.00	29.45	SPT10	34	22		- dense, 29.0 to 32.0 m																	
31.00	31.45	DS9																					
32.00	32.45	SPT11	57	35		- very dense, 32.0 to 34.5 m																	
34.00	34.45	DS10																					

[1] SPT is outside NABL scope.

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Boring Start : 07-Jan-18
Boring Finish : 08-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
35.00	35.45	SPT12	74	44		Very dense brown silty fine sand (SM)	35.45																

[1] SPT is outside NABL scope.

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Soil Profile (BH-6)

Location : Khurja, U.P.
UTM Coordinates : 785940 E, 3118715 N
Termination Depth : 50.32 m (m)
Ground Water Depth : 5.80 m
Boring Method : Shell & Auger
Casing Depth : 48.5 m
Boring Start : 10-Jan-18
Boring Finish : 12-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
0.00	1.00	DS1				Stiff brown sandy silt with gravels, low plastic (CL)																	
1.00	1.45	UDS1						5	40	48	7				1.90	1.71	11.0						
2.00	2.45	SPT1	10	13			4.00																
4.00	4.45	UDS2				Medium dense brown silty fine sand (SM)									1.93	1.67	16.1						
5.00	5.45	SPT2	18	19				0	83	17	0												
7.00	8.00	DS2																					
8.00	8.45	SPT3	15	14																			
10.00	11.00	DS3						0	58	41	1												
11.00	11.45	SPT4	15	13																			
13.00	14.00	DS4																					
14.00	14.45	SPT5	12	10				0	80	20	0												
16.00	16.45	DS5																					

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Soil Profile (BH-6)

Location : Khurja, U.P.
UTM Coordinates : 785940 E, 3118715 N
Termination Depth : 50.32 m (m)
Ground Water Depth : 5.80 m
Boring Method : Shell & Auger
Casing Depth : 48.5 m
Boring Start : 10-Jan-18
Boring Finish : 12-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
17.00	17.45	SPT6	35	28		Dense brown silty fine sand (SM)	17.50																
17.50	17.70	DS6				Hard brown silty clay, high plastic (CH)	19.00					52.0	27.5	24.5									
19.00	20.00	DS7				Dense to very dense grey fine sand (SP-SM)																	
20.00	20.45	SPT7	38	29		- dense, 19.0 to 26.0 m		0	94	6	0												
22.00	22.35	UDS3													1.96	1.67	17.7						
23.00	23.45	SPT8	33	24																			
25.00	25.50	DS8																					
26.00	26.45	SPT9	64	43		- very dense, 26.0 to 29.0 m																	
28.00	29.00	DS9						0	89	11	0												
29.00	29.45	SPT10	38	24		- dense, 29.0 to 32.0 m																	
31.00	32.00	DS10																					
32.00	32.45	SPT11	60	37		- very dense, 32.0 to 34.0 m																	

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Soil Profile (BH-6)

Location : Khurja, U.P.
UTM Coordinates : 785940 E, 3118715 N
Termination Depth : 50.32 m (m)
Ground Water Depth : 5.80 m
Boring Method : Shell & Auger
Casing Depth : 48.5 m
Boring Start : 10-Jan-18
Boring Finish : 12-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
34.00	35.00	DS11				Very dense grey fine sand (SP-SM)																	
35.00	35.45	SPT12	51	30																			
37.00	38.00	DS12																					
38.00	38.45	SPT13	73	41																			
40.00	40.45	DS13					41.00																
41.00	41.35	SPT14	109/ 20cm	-		Very dense brown silty fine sand (SM)		0	80	20	0												
43.00	44.00	DS14																					
44.00	44.31	SPT15	103/ 16cm	-																			
46.00	47.00	DS15																					
47.00	47.35	SPT16	101/ 20cm	-																			
49.00	50.00	DS16																					
50.00	50.32	SPT17	107/ 17cm	-			50.32																

[1] SPT is outside NABL scope.

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Soil Profile (BH-8)

Location : Khurja, U.P.
UTM Coordinates : 785864 E, 3118907 N
Termination Depth : 40.45 m (m)
Ground Water Depth : 5.85 m
Boring Method : Shell & Auger
Casing Depth : 37.5 m
Boring Start : 13-Jan-18
Boring Finish : 15-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
0.00	1.00	DS1				Stiff brown sandy silt, low plastic (CL)																	
1.00	1.45	SPT1	8	12								33.8	17.9	15.9									
2.00	2.45	UDS1						0	30	63	7				1.84	1.63	13.3						
4.00	4.45	SPT2	11	12																			
5.00	5.45	UDS2					7.00								1.84	1.65	11.6						
7.00	7.45	SPT3	11	11		Medium dense brown silty fine sand (SM)		0	86	14	0												
8.00	9.00	DS2																					
10.00	10.45	SPT4	13	12				0	79	21	0												
11.00	12.00	DS3																					
13.00	13.45	SPT5	20	17																			
14.00	15.00	DS4						0	81	19	0												
16.00	16.45	SPT6	27	22			17.00																

[1] SPT is outside NABL scope.

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Soil Profile (BH-8)

Location : Khurja, U.P.
UTM Coordinates : 785864 E, 3118907 N
Termination Depth : 40.45 m (m)
Ground Water Depth : 5.85 m
Boring Method : Shell & Auger
Casing Depth : 37.5 m
Boring Start : 13-Jan-18
Boring Finish : 15-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
17.00	18.00	DS5				Dense to very dense grey fine sand (SP-SM)																	
19.00	19.45	SPT7	33	25		- dense, 17.0 to 25.0 m																	
20.00	21.00	DS6																					
22.00	22.45	SPT8	42	30																			
23.00	24.00	DS7				- with traces of gravel, 17.0 to 32.0 m		3	88	9	0												
25.00	25.45	SPT9	57	39		- very dense, 25.0 to 35.0 m																	
26.00	27.00	DS8																					
28.00	28.45	SPT10	74	48																			
29.00	30.00	DS9																					
31.00	31.45	SPT11	68	42																			
32.00	33.00	DS10						0	92	8	0												
34.00	34.45	SPT12	70	42																			

[1] SPT is outside NABL scope.

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Soil Profile (BH-8)

Location : Khurja, U.P.
UTM Coordinates : 785864 E, 3118907 N
Termination Depth : 40.45 m (m)
Ground Water Depth : 5.85 m
Boring Method : Shell & Auger
Casing Depth : 37.5 m
Boring Start : 13-Jan-18
Boring Finish : 15-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
35.00	36.00	DS11				Very dense grey fine sand (SP-SM)																	
37.00	37.45	SPT13	81	46																			
38.00	39.00	DS12																					
40.00	40.45	SPT14	98	53			40.45																

[1] SPT is outside NABL scope.

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Soil Profile (BH-9)

Location : Khurja, U.P.
UTM Coordinates : 785846 E, 3118762 N
Termination Depth : 50.43 m (m)
Ground Water Depth : 5.00 m
Boring Method : Shell & Auger
Casing Depth : 46.0 m
Boring Start : 04-Jan-18
Boring Finish : 08-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Loose to medium dense grey silty fine sand (SM)																	
1.00	1.45	SPT1	9	14		- loose, 0.0 to 3.0 m												2.68					
2.00	2.45	UDS1						0	81	19	0				1.86	1.72	8.4		DS	0.5 ,1, 1.5	0.0	36.0	
3.00	3.45	SPT2	16	19		- medium dense, 3.0 to 6.0 m																	
5.00	5.45	UDS2					6.00								1.92	1.71	12.1						
6.00	6.45	SPT3	23	24		Medium dense grey fine sand (SP-SM)		0	94	6	0												
8.00	8.45	DS2																					
9.00	9.45	SPT4	25	24																			
11.00	11.45	DS3																					
12.00	12.45	SPT5	18	16			14.00																
14.00	14.45	DS4				Medium dense brown silty fine sand with traces of gravel (SM)		4	81	15	0												
15.00	15.45	SPT6	22	19			17.00																

[1] SPT is outside NABL scope.

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Soil Profile (BH-9)

Location : Khurja, U.P.
UTM Coordinates : 785846 E, 3118762 N
Termination Depth : 50.43 m (m)
Ground Water Depth : 5.00 m
Boring Method : Shell & Auger
Casing Depth : 46.0 m
Boring Start : 04-Jan-18
Boring Finish : 08-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
17.00	17.45	DS5				Medium dense grey fine sand (SP-SM)																	
18.00	18.45	SPT7	20	16																			
20.00	20.45	DS6					21.00																
21.00	21.45	SPT8	36	27		Hard brown sandy silt, low plastic (CL)	23.00					32.1	16.5	15.6									
23.00	23.45	DS7				Dense to very dense grey fine sand (SP-SM)																	
24.00	24.45	SPT9	44	31		- dense, 24.0 to 27.0 m																	
26.00	26.45	DS8																					
27.00	27.45	SPT10	62	42		- very dense, 27.0 to 33.0 m		0	95	5	0												
29.00	29.45	DS9																					
30.00	30.45	SPT11	65	42																			
32.00	32.45	DS10																					
33.00	33.45	SPT12	45	28		- dense, 33.0 to 33.5 m																	

[1] SPT is outside NABL scope.

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Soil Profile (BH-9)

Location : Khurja, U.P.
UTM Coordinates : 785846 E, 3118762 N
Termination Depth : 50.43 m (m)
Ground Water Depth : 5.00 m
Boring Method : Shell & Auger
Casing Depth : 46.0 m
Boring Start : 04-Jan-18
Boring Finish : 08-Jan-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)	Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
35.00	35.45	DS11				Very dense grey fine sand (SP-SM)	36.00								2.06	1.84	12.1						
36.00	36.45	SPT13	84	49		Hard brown sandy silt, low plastic (CL)	38.00					27.2	20.1	7.1									
38.00	38.45	DS12				Very dense grey fine sand (SP-SM)																	
39.00	39.42	SPT14	104/ 27cm	-																			
41.00	41.45	DS13																					
42.00	42.40	SPT15	105/ 25cm	-				0	93	7	0												
44.00	44.45	DS14																					
45.00	45.35	SPT16	102/ 20cm	-																			
47.00	47.45	DS15																					
48.00	48.45	SPT17	80	39																			
50.00	50.43	SPT18	102/ 28cm	-			50.43																

[1] SPT is outside NABL scope.

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Soil Profile (BH-3)

Location : Area-1
UTM Coordinates : 786019 E, 3118803 N
Termination Depth : 50.32 m
Ground Water Depth : 5.70 m
Boring Method : Shell & Auger
Casing Depth : 46.4 m
Boring Start : 07-Feb-18
Boring Finish : 11-Feb-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
0.00	1.00	DS1				Stiff brown sandy silt, low plastic (CL)																		
1.00	1.45	UDS1										25.0	16.4	8.6						UC		0.8		0
2.50	2.95	SPT1	12	15								33.8	23.6	10.3										
4.00	4.45	UDS2					5.50	0	38	53	9					2.01	1.68	19.5	2.67					
5.50	5.95	SPT2	17	17		Medium dense grey silty fine sand (SM)																		
7.00	7.45	UDS3					8.50	2	83	15										DS	0.5 ,1, 1.5	0.0	30.9	
8.50	8.95	SPT3	20	19		Medium dense grey fine sand (SP-SM)																		
10.00	10.33	UDS4																						
11.50	11.95	SPT4	27	24																				
13.00	13.26	UDS5														2.01	1.67	20.5		DS	0.5 ,1, 1.5	0.0	33.7	
14.50	14.95	SPT5	29	24																				
16.00	16.50	DS2																						

[1] SPT is outside NABL scope.

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Soil Profile (BH-3)

Location : Area-1
UTM Coordinates : 786019 E, 3118803 N
Termination Depth : 50.32 m
Ground Water Depth : 5.70 m
Boring Method : Shell & Auger
Casing Depth : 46.4 m
Boring Start : 07-Feb-18
Boring Finish : 11-Feb-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
17.50	17.90	SPT6	100/ 25cm	-		Very dense grey fine sand (SP-SM)																		
19.00	19.45	UDS6					20.50																	
20.50	20.95	SPT7	52	39		Hard brown sandy silt, low plastic (CL)	22.00					31.2	21.4	9.8										
22.00	22.21	UDS7				Very dense grey silty fine sand (SM)	23.50	0	70	28	2													
23.50	23.95	SPT8	83	59		Very dense grey fine sand (SP-SM)																		
25.00	25.50	DS3																						
26.50	26.89	SPT9	100/ 24cm	-																				
28.00	28.50	DS4																						
29.50	29.95	SPT10	102	65																				
31.00	31.50	DS5																						
32.50	32.90	SPT11	100/ 25cm	-																				
34.00	34.50	DS6																						

[1] SPT is outside NABL scope.

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Soil Profile (BH-3)

Location : Area-1
UTM Coordinates : 786019 E, 3118803 N
Termination Depth : 50.32 m
Ground Water Depth : 5.70 m
Boring Method : Shell & Auger
Casing Depth : 46.4 m
Boring Start : 07-Feb-18
Boring Finish : 11-Feb-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
35.50	35.88	SPT12	100/ 23cm	-		Very dense grey fine sand (SP-SM)																		
37.00	37.50	DS7																						
38.50	38.88	SPT13	102/ 23cm	-																				
40.00	40.50	DS8																						
41.50	41.86	SPT14	101/ 21cm	-																				
43.00	43.50	DS9																						
44.50	44.85	SPT15	102/ 20cm	-																				
46.00	46.50	DS10																						
47.50	47.83	SPT16	101/ 10cm	-																				
49.00	49.50	DS11																						
50.00	50.32	SPT17	100/ 17cm	-			50.32																	

[1] SPT is outside NABL scope.

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Soil Profile (BH-21)

Location : Area-2
UTM Coordinates : 786024 E, 3118574 N
Termination Depth : 35.45 m
Ground Water Depth : 6.00 m
Boring Method : Shell & Auger
Casing Depth : 33.5 m
Boring Start : 21-Feb-18
Boring Finish : 22-Feb-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Stiff grey clayey silt, medium plastic (CI)																		
1.00	1.45	UDS1										35.3	23.1	12.2		1.77	1.66	6.8		UC		2.0		
2.50	2.95	SPT1	14	18			4.00	0	8	74	18													
4.00	4.45	UDS2				Stiff grey sandy silt, low plastic (CL)										1.90	1.74	9.4		DS	0.5 ,1, 1.5	0.0	34.9	
5.50	5.95	SPT2	11	11			7.00	0	17	70	13								2.67					
7.00	7.45	UDS3				Medium dense grey silty fine sand (SM)		0	66	32	2					1.96	1.68	16.7						
8.50	8.95	SPT3	16	15				0	56	41	3													
10.00	10.45	UDS4					11.50									1.99	1.73	14.9		DS	0.5 ,1, 1.5	0.0	31.5	
11.50	11.95	SPT4	22	19		Medium dense grey fine sand (SP-SM)																		
13.00	13.50	DS2																						
14.50	14.95	SPT5	28	23		- with traces of gravel, 14.5 to 16.0 m		2	88	10	0													
16.00	16.50	DS3																						

[1] SPT is outside NABL scope.

CENGRS

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Soil Profile (BH-21)

Location : Area-2
UTM Coordinates : 786024 E, 3118574 N
Termination Depth : 35.45 m
Ground Water Depth : 6.00 m
Boring Method : Shell & Auger
Casing Depth : 33.5 m
Boring Start : 21-Feb-18
Boring Finish : 22-Feb-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
17.50	17.95	SPT6	34	27		Dense to very dense grey fine sand (SP-SM)																		
19.00	19.50	DS4				- dense, 17.5 to 29.5 m																		
20.50	20.95	SPT7	37	27																				
22.00	22.50	DS5																						
23.50	23.95	SPT8	45	32																				
25.00	25.50	DS6				- with gravels, 25.0 to 26.5 m		5	87	8	0													
26.50	26.95	SPT9	49	33																				
28.00	28.50	DS7																						
29.50	29.95	SPT10	62	39		- very dense, 29.5 to 35.0 m																		
31.00	31.50	DS8																						
32.50	32.95	SPT11	69	42				0	92	8	0													
34.00	34.50	DS9																						

[1] SPT is outside NABL scope.

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Soil Profile (BH-21)

Location : Area-2
UTM Coordinates : 786024 E, 3118574 N
Termination Depth : 35.45 m
Ground Water Depth : 6.00 m
Boring Method : Shell & Auger
Casing Depth : 33.5 m
Boring Start : 21-Feb-18
Boring Finish : 22-Feb-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
35.00	35.45	SPT12	74	43		Very dense grey fine sand (SP-SM)	35.45																	

[1] SPT is outside NABL scope.

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Certified Laboratory
(NABL)
Certificate No. T-1741

Soil Profile (BH-5)

Location : Area-1
UTM Coordinates : 786000 E, 3118713 N
Termination Depth : 20.45 m
Ground Water Depth : 5.50 m
Boring Method : Shell & Auger
Casing Depth : 18.5 m
Boring Start : 03-Mar-18
Boring Finish : 03-Mar-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Very stiff brown sandy silt with gravels, low plastic (CL)						28.6	16.8	11.8										
1.00	1.45	UDS1						24	15	54	7	29.7	20.5	9.2		1.83	1.69	8.5		UU	1 ,2, 3	1.0	12.0	
2.50	2.95	SPT1	16	20																				
4.00	4.45	UDS2					5.50									1.72	1.55	11.6		DS	0.5 ,1, 1.5	0.0	32.4	
5.50	5.95	SPT2	17	17		Medium dense grey silty fine sand (SM)		0	61	36	3													
7.00	7.45	UDS3																	2.66	DS	0.5 ,1, 1.5	0.0	29.2	
8.50	8.95	SPT3	21	20																				
10.00	10.45	UDS4						0	72	27	1									DS	0.5 ,1, 1.5	0.0	35.9	
11.50	11.95	SPT4	25	22																				
13.00	13.50	DS2																						
14.50	14.95	SPT5	29	24				0	80	20														
16.00	16.50	DS3					17.50																	

[1] SPT is outside NABL scope.

** Soil Classification based on field visual

CENGRS

ISO/IEC 17025:2005
Certified Laboratory
(NABL)
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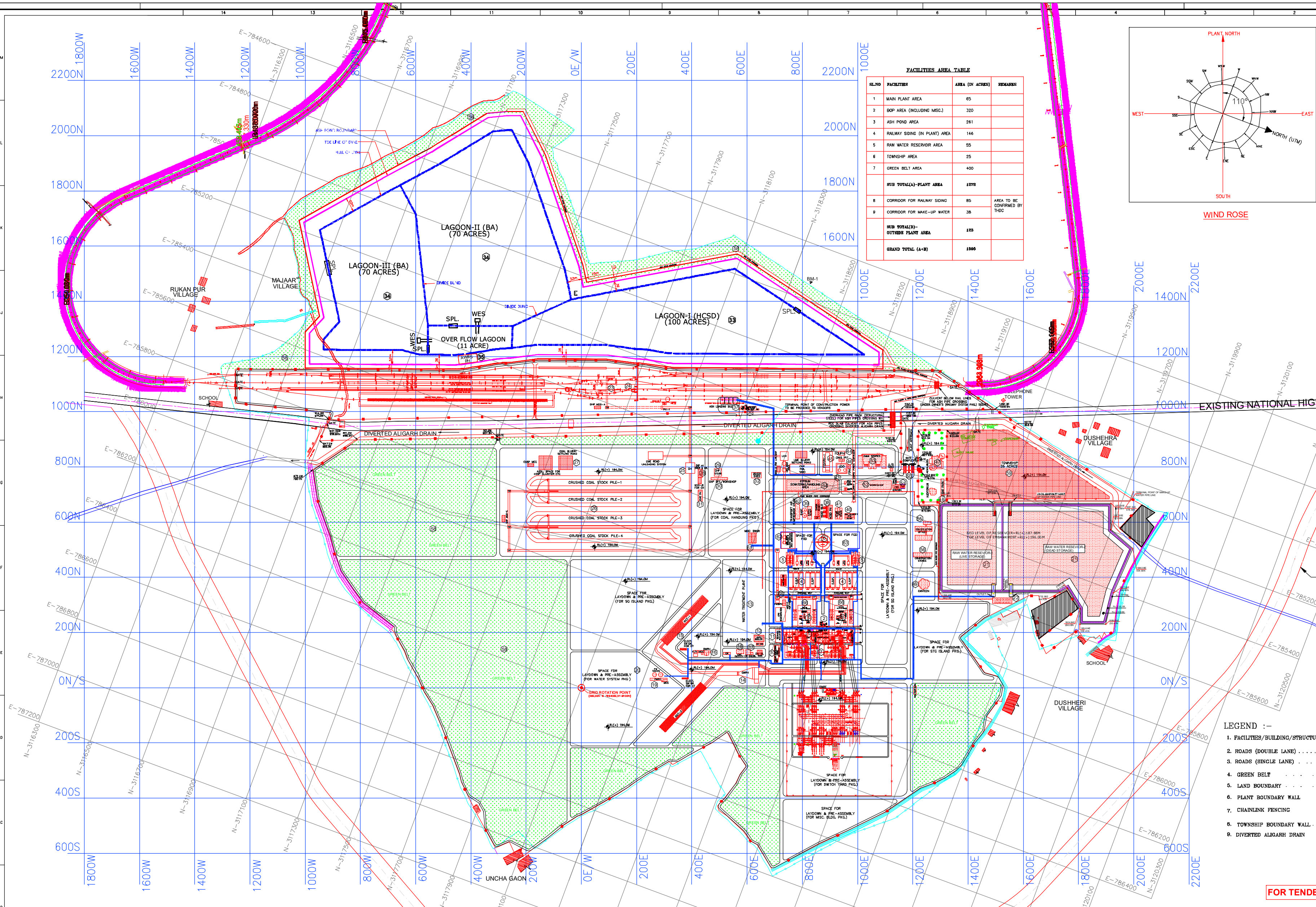
Soil Profile (BH-5)

Location : Area-1
UTM Coordinates : 786000 E, 3118713 N
Termination Depth : 20.45 m
Ground Water Depth : 5.50 m
Boring Method : Shell & Auger
Casing Depth : 18.5 m
Boring Start : 03-Mar-18
Boring Finish : 03-Mar-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
17.50	17.95	SPT6	33	26		Dense grey fine sand (SP-SM)																		
19.00	19.50	DS4																						
20.00	20.45	SPT7	31	24			20.45																	

[1] SPT is outside NABL scope.

** Soil Classification based on field visual



FACILITIES AREA TABLE

SL.NO	FACILITIES	AREA (IN ACRES)	REMARKS
1	MAIN PLANT AREA	65	
2	BOP AREA (INCLUDING MISC.)	320	
3	ASH POND AREA	261	
4	RAILWAY SIDING (IN PLANT) AREA	146	
5	RAW WATER RESERVOIR AREA	55	
6	TOWNSHIP AREA	25	
7	GREEN BELT AREA	400	
	SUB TOTAL(A)-PLANT AREA	1272	
8	CORRIDOR FOR RAILWAY SIDING	85	AREA TO BE CONFIRMED BY THDC
9	CORRIDOR FOR MAKE-UP WATER	38	
	SUB TOTAL(B)- OUTSIDE PLANT AREA	123	
	GRAND TOTAL (A+B)	1395	

ITEM LISTS

SL.No.	DESCRIPTION
1	STEAM TURBINE BUILDING
2	CONTROL BUILDING / A.C. PLANT
3	STEAM GENERATOR AREA
4	ELECTROSTATIC PRECIPITATOR
5	ESP CONTROL ROOM
6	CHIMNEY
7	TRANSFORMER YARD
8	SWITCHYARD
9	SWITCHYARD CONTROL ROOM
10	COMPRESSOR HOUSE
11	SERVICE BUILDING
12	AUX BOILER
13	WATER TREATMENT PLANT
14	C W.PUMP HOUSE
15	COOLING TOWER
16	SW PUMP HOUSE
17	C W.CHLORINATION BUILDING
18	CWT FACILITY
19	FIRE WATER PUMP HOUSE
20	FIRE WATER TANK
21	RAW WATER RESERVOIR
22	RAW WATER PUMP HOUSE
23	WAGON TIPPLER
24	WAGON TIPPLER CONTROL ROOM
25	CRUSHER HOUSE
26	CRUSHED COAL STOCK PILE
27	COAL SLUDGE SETTLING POND & P/H
28	CHP CONTROL ROOM
29	CHP OFFCE & STORE
30	CHP MAINTENANCE BUILDING
31	CHP PUMP HOUSE
32	DOZER SHED
33	HCSD ASH DYKE
34	BOTTOM ASH DYKE
35	ASH WATER RECIRCULATION PUMP HOUSE
36	ASH SILO UTILITY BUILDING
37	ASH SILO
38	HCSD SYSTEM
39	ASH WATER PUMP HOUSE / BAST
40	ASH SLURRY PUMP HOUSE
41	ASH SLURRY HT/LT SWGR & TRANSFORMER
42	F.A. CONVEYING AIR COMPRESSOR HOUSE
43	FUEL OIL TANK FARM AREA
44	FUEL OIL UNLOADING PUMP HOUSE
45	FUEL OIL PRESSURISING PUMP HOUSE
46	FOAM PUMP HOUSE
47	ADMINISTRATION BUILDING
48	PARKING PLACE
49	CANTEEN
50	GATE COMPLEX
51	FIRE STATION
52	O & M WORKSHOP
53	O & M STORE
54	DELETED
55	CONSTRUCTION OFFICES
56	CONSTRUCTION STORES
57	DELETED
58	GREEN BELT
59	TOWN SHIP
60	DELETED
61	11KV MISC SWITCHGEAR ROOM
62	LIME HANDLING SYSTEM
63	FGD SYSTEM
64	GYPSUM STORAGE AREA
65	AMMONIA STORAGE AREA
66	SELECTIVE CATALYTIC REDUCTION

LEGEND :-

1. FACILITIES/BUILDING/STRUCTURE
2. ROADS (DOUBLE LANE)
3. ROADS (SINGLE LANE)
4. GREEN BELT
5. LAND BOUNDARY
6. PLANT BOUNDARY WALL
7. CHAINLINK FENCING
8. TOWNSHIP BOUNDARY WALL
9. DIVERTED ALIGARH DRAIN

NOTES:

1. ALL CO-ORDINATES ARE IN METRES.
2. FOR DETAILS IN MAIN PLANT BLOCK REFER EQUIPMENT LAYOUT PLAN DRAWING
3. FOR SCOPE AND DETAILS OF PIPE & CABLE TRESTLE REFER 'DRAWING NO 9915-999-POM-F-006' TITLED 'PIPE & CABLE TRESTLE LAYOUT'
4. FORMATION LEVEL OF THE PROJECT SITE IS AT RL(+)194.0M
5. EL(±)0.00M CORRESPONDS TO RL(+)194.5M, WHICH IS FINISHED FLOOR LEVEL (FFL) OF MAIN POWER HOUSE (MPH) GROUND FLOOR
6. THE AREA FOR CONSTRUCTION/ERECTION FACILITIES LIKE LAY-DOWN, PRE-ASSEMBLY,OFFICES AND STORES IS TO BE MANAGED BY BIDDER WITHIN THE ALLOCATED AREA FOR RESPECTIVE PACKAGES WITHIN THE PLANT BOUNDARY AS SHOWN IN GENERAL LAYOUT PLAN. IN CASE BIDDER REQUIRES ADDITIONAL AREA, HE SHALL MAKE HIS OWN ARRANGEMENT AT HIS COST OUTSIDE THE PLANT BOUNDARY DEVELOPMENT OF THE SAME INCLUDING SECURITY ETC. FOR THE INTENDED USE WILL ALSO BE HIS RESPONSIBILITY.
7. FGL FOR FACILITIES IN RAILWAY SIDING AREA SHALL BE RL 196.0M

SPECIAL NOTE:

PLANT GRIDS ARE ROTATED AT AN ANGLE OF 110° COUNTER CLOCKWISE AND COMMON POINT OF ROTATION IS 0.0E,0.0N AS PER NEW GRID SYSTEM AND 786400E,3118100N AS PER OLD GRID SYSTEM (SURVEY GRID) AS SHOWN IN THE DRAWING.

FOR TENDER PURPOSE ONLY

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD	M	E	C	C&I	ES	APPD	DATE
2	(a) LAYDOWN AREA MARKED FOR VARIOUS PKGS (b) RAW WATER RESEVIOR LAYOUT UPDATED	MANOJ	ND								10.05.18
1	GENERALLY UPDATED	MANOJ	AA								23.08.18
0	FOR TENDER PURPOSE	MANOJ	AA		JS/SKD MT/AVK	PR/SU	RB	RS		RB	08.06.18

CLEARED BY

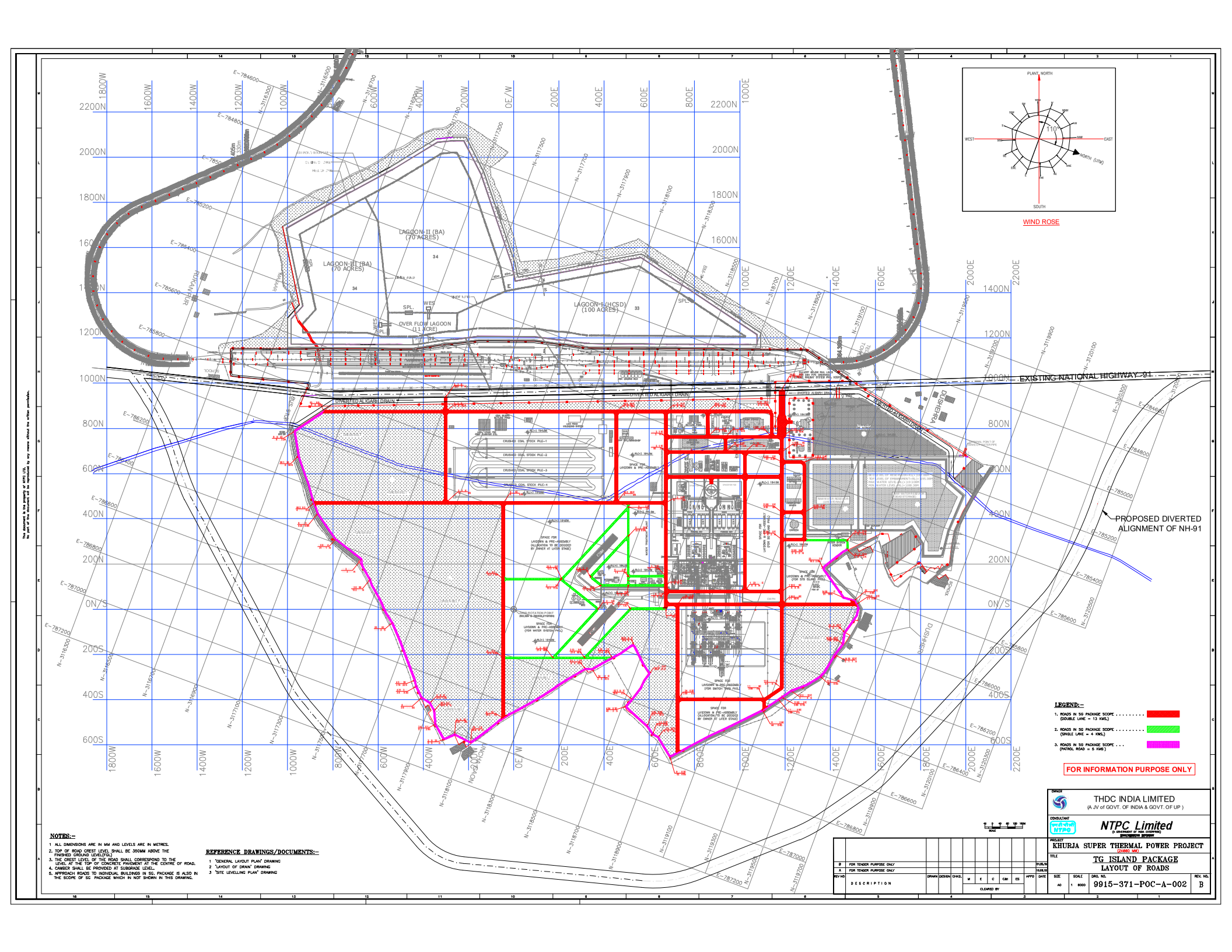
OWNER: THDC INDIA LIMITED (A JV of GOVT. OF INDIA & GOVT. OF UP)

CONSULTANT: NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION

PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW)

TITLE: GENERAL LAYOUT PLAN

SIZE	SCALE	DRG. NO.	REV. NO.
A0	1 : 4000	9915-999-POC-F-001	2



NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES.
2. TOP OF ROAD CREST LEVEL SHALL BE 350MM ABOVE THE FINISHED GROUND LEVEL(FGL)
3. THE CREST LEVEL OF THE ROAD SHALL CORRESPOND TO THE LEVEL AT THE TOP OF CONCRETE PAVEMENT AT THE CENTRE OF ROAD.
4. CAMBER SHALL BE PROVIDED AT SUBGRADE LEVEL.
5. APPROACH ROADS TO INDIVIDUAL BUILDINGS IN SG PACKAGE IS ALSO IN THE SCOPE OF SG PACKAGE WHICH IN NOT SHOWN IN THIS DRAWING.

REFERENCE DRAWINGS/DOCUMENTS:-

1. "GENERAL LAYOUT PLAN" DRAWING
2. "LAYOUT OF DRAIN" DRAWING
3. "SITE LEVELLING PLAN" DRAWING

REV NO	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
B	FOR TENDER PURPOSE ONLY										01/05/19
A	FOR TENDER PURPOSE ONLY										15/04/19

CLEARED BY

OWNER: THDC INDIA LIMITED (A JV of GOVT. OF INDIA & GOVT. OF UP)

CONSULTANT: NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW)

TITLE: TG ISLAND PACKAGE LAYOUT OF ROADS

SIZE	SCALE	DRG. NO.	REV. NO.
A0	1 : 8000	9915-371-POC-A-002	B

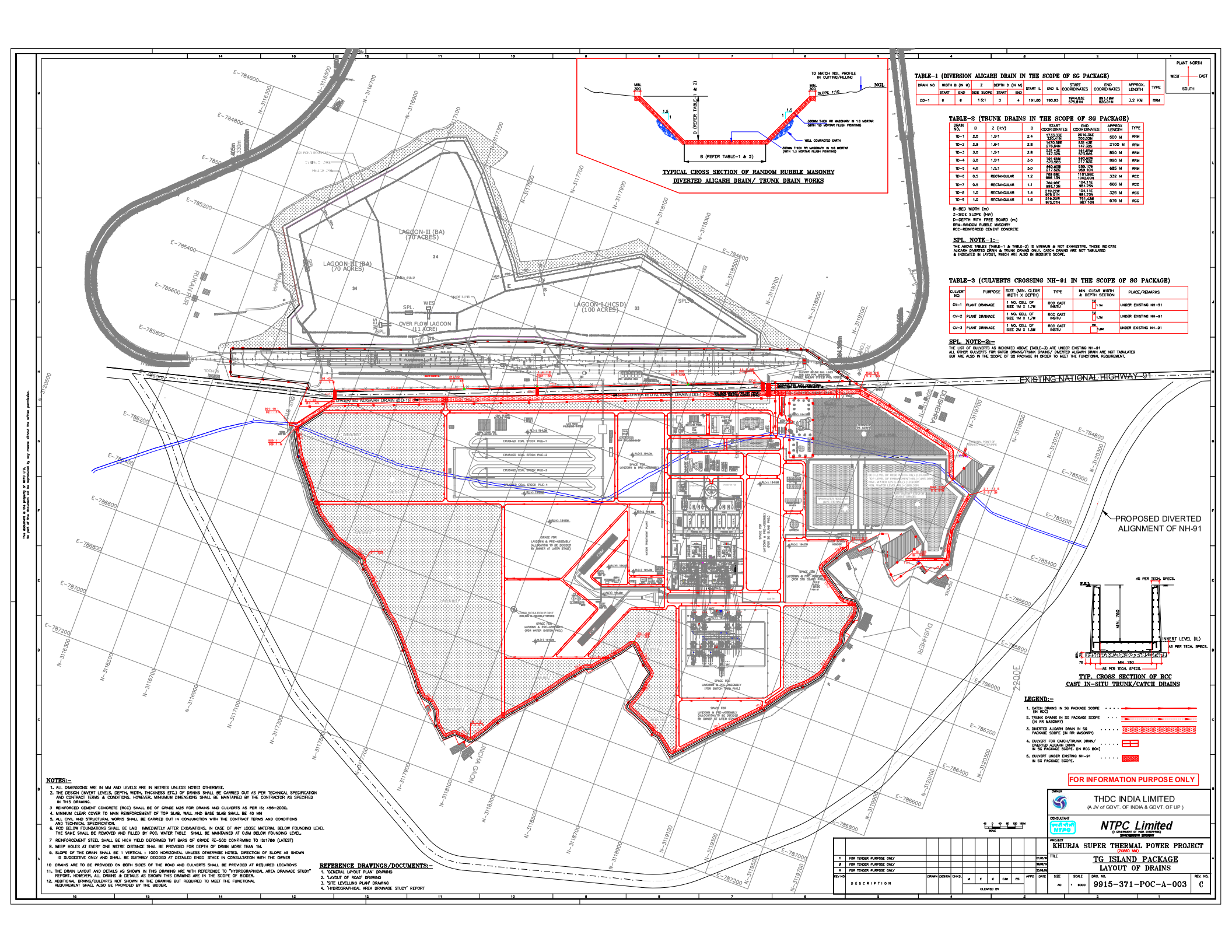


TABLE-1 (DIVERSION ALIGARH DRAIN IN THE SCOPE OF SG PACKAGE)

DRAIN NO	WIDTH B (IN M)		Z	DEPTH D (IN M)		START IL	END IL	START COORDINATES	END COORDINATES	APPROX. LENGTH	TYPE
	START	END	SIDE SLOPE	START	END						
DD-1	6	6	1.5:1	3	4	191.80	190.93	1944.63E 575.81N	891.19N 820.01N	3.2 KM	RRM

TABLE-2 (TRUNK DRAINS IN THE SCOPE OF SG PACKAGE)

DRAIN NO.	B	Z (H:V)	D	START COORDINATES	END COORDINATES	APPROX LENGTH	TYPE
TD-1	2.0	1.5:1	2.4	1733.33E 225.41N	2016.36E 305.02N	500 M	RRM
TD-2	2.9	1.5:1	2.8	1470.58E 276.94N	531.43E 147.32N	2100 M	RRM
TD-3	3.0	1.5:1	2.8	531.43E 147.32N	181.45W 513.52N	850 M	RRM
TD-4	3.0	1.5:1	3.0	191.45W 513.52N	560.80W 217.52N	990 M	RRM
TD-5	4.0	1.5:1	3.0	560.80W 217.52N	959.10W 959.10N	685 M	RRM
TD-6	0.5	RECTANGULAR	1.2	769.98E 998.13N	1101.98E 1002.00N	332 M	RCC
TD-7	0.5	RECTANGULAR	1.1	768.98E 998.13N	104.11E 981.70N	666 M	RCC
TD-8	1.0	RECTANGULAR	1.4	219.23W 975.01N	104.11E 981.72N	326 M	RCC
TD-9	1.0	RECTANGULAR	1.6	219.25W 975.01N	791.43W 987.18N	575 M	RCC

B-BED WIDTH (m)
Z-SIDE SLOPE (H:V)
D-DEPTH WITH FREE BOARD (m)
RRM-RANDOM RUBBLE MASONRY
RCC-REINFORCED CEMENT CONCRETE

SPL. NOTE-1:-

THE ABOVE TABLES (TABLE-1 & TABLE-2) IS MINIMUM & NOT EXHAUSTIVE. THESE INDICATE ALIGARH DIVERTED DRAIN & TRUNK DRAINS ONLY. CATCH DRAINS ARE NOT TABULATED & INDICATED IN LAYOUT, WHICH ARE ALSO IN BIDDER'S SCOPE.

TABLE-3 (CULVERTS CROSSING NH-91 IN THE SCOPE OF SG PACKAGE)

CULVERT NO.	PURPOSE	SIZE (MIN. CLEAR WIDTH X DEPTH)	TYPE	MIN. CLEAR WIDTH & DEPTH SECTION	PLACE/REMARKS
CV-1	PLANT DRAINAGE	1 NO. CELL OF SIZE 1M X 1.7M	RCC CAST INSITU	1M, 1.7M	UNDER EXISTING NH-91
CV-2	PLANT DRAINAGE	1 NO. CELL OF SIZE 1M X 1.7M	RCC CAST INSITU	1M, 1.7M	UNDER EXISTING NH-91
CV-3	PLANT DRAINAGE	1 NO. CELL OF SIZE 2M X 1.8M	RCC CAST INSITU	2M, 1.8M	UNDER EXISTING NH-91

SPL. NOTE-2:-

THE LIST OF CULVERTS AS INDICATED ABOVE (TABLE-3) ARE UNDER EXISTING NH-91
ALL OTHER CULVERTS FOR CATCH DRAINS/TRUNK DRAINS/ DIVERTED ALIGARH DRAIN ARE NOT TABULATED BUT ARE ALSO IN THE SCOPE OF SG PACKAGE IN ORDER TO MEET THE FUNCTIONAL REQUIREMENT.

TYP. CROSS SECTION OF RCC CAST IN-SITU TRUNK/CATCH DRAINS

LEGEND:-

1. CATCH DRAINS IN SG PACKAGE SCOPE (IN RCC)
2. TRUNK DRAINS IN SG PACKAGE SCOPE (IN RR MASONRY)
3. DIVERTED ALIGARH DRAIN IN SG PACKAGE SCOPE (IN RR MASONRY)
4. CULVERT FOR CATCH/TRUNK DRAIN/ DIVERTED ALIGARH DRAIN IN SG PACKAGE SCOPE. (IN RCC BOX)
5. CULVERT UNDER EXISTING NH-91 IN SG PACKAGE SCOPE.

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
2. THE DESIGN (INVERT LEVELS, DEPTH, WIDTH, THICKNESS ETC.) OF DRAINS SHALL BE CARRIED OUT AS PER TECHNICAL SPECIFICATION AND CONTRACT TERMS & CONDITIONS. HOWEVER, MINIMUM DIMENSIONS SHALL BE MAINTAINED BY THE CONTRACTOR AS SPECIFIED IN THIS DRAWING.
3. REINFORCED CEMENT CONCRETE (RCC) SHALL BE OF GRADE M25 FOR DRAINS AND CULVERTS AS PER IS: 456-2000.
4. MINIMUM CLEAR COVER TO MAIN REINFORCEMENT OF TOP SLAB, WALL AND BASE SLAB SHALL BE 40 MM
5. ALL CIVIL AND STRUCTURAL WORKS SHALL BE CARRIED OUT IN CONJUNCTION WITH THE CONTRACT TERMS AND CONDITIONS AND TECHNICAL SPECIFICATION.
6. PCC BELOW FOUNDATIONS SHALL BE LAID IMMEDIATELY AFTER EXCAVATIONS, IN CASE OF ANY LOOSE MATERIAL BELOW FOUNDING LEVEL THE SAME SHALL BE REMOVED AND FILLED BY PCC. WATER TABLE SHALL BE MAINTAINED AT 0.5M BELOW FOUNDING LEVEL.
7. REINFORCEMENT STEEL SHALL BE HIGH YIELD DEFORMED TMT BARS OF GRADE FE-500 CONFORMING TO IS:1786 (LATEST)
8. WEEP HOLES AT EVERY ONE METRE DISTANCE SHAL BE PROVIDED FOR DEPTH OF DRAIN MORE THAN 1M.
9. SLOPE OF THE DRAIN SHALL BE 1 VERTICAL : 1000 HORIZONTAL UNLESS OTHERWISE NOTED. DIRECTION OF SLOPE AS SHOWN IS SUGGESTIVE ONLY AND SHALL BE SUITABLY DECIDED AT DETAILED ENGG. STAGE IN CONSULTATION WITH THE OWNER
10. DRAINS ARE TO BE PROVIDED ON BOTH SIDES OF THE ROAD AND CULVERTS SHALL BE PROVIDED AT REQUIRED LOCATIONS
11. THE DRAIN LAYOUT AND DETAILS AS SHOWN IN THIS DRAWING ARE WITH REFERENCE TO "HYDROGRAPHICAL AREA DRAINAGE STUDY" REPORT. HOWEVER, ALL DRAINS & DETAILS AS SHOWN THIS DRAWING ARE IN THE SCOPE OF BIDDER.
12. ADDITIONAL DRAINS/CULVERTS NOT SHOWN IN THE DRAWING BUT REQUIRED TO MEET THE FUNCTIONAL REQUIREMENT SHALL ALSO BE PROVIDED BY THE BIDDER.

REFERENCE DRAWINGS/DOCUMENTS:-

1. "GENERAL LAYOUT PLAN" DRAWING
2. "LAYOUT OF ROAD" DRAWING
3. "SITE LEVELLING PLAN" DRAWING
4. "HYDROGRAPHICAL AREA DRAINAGE STUDY" REPORT

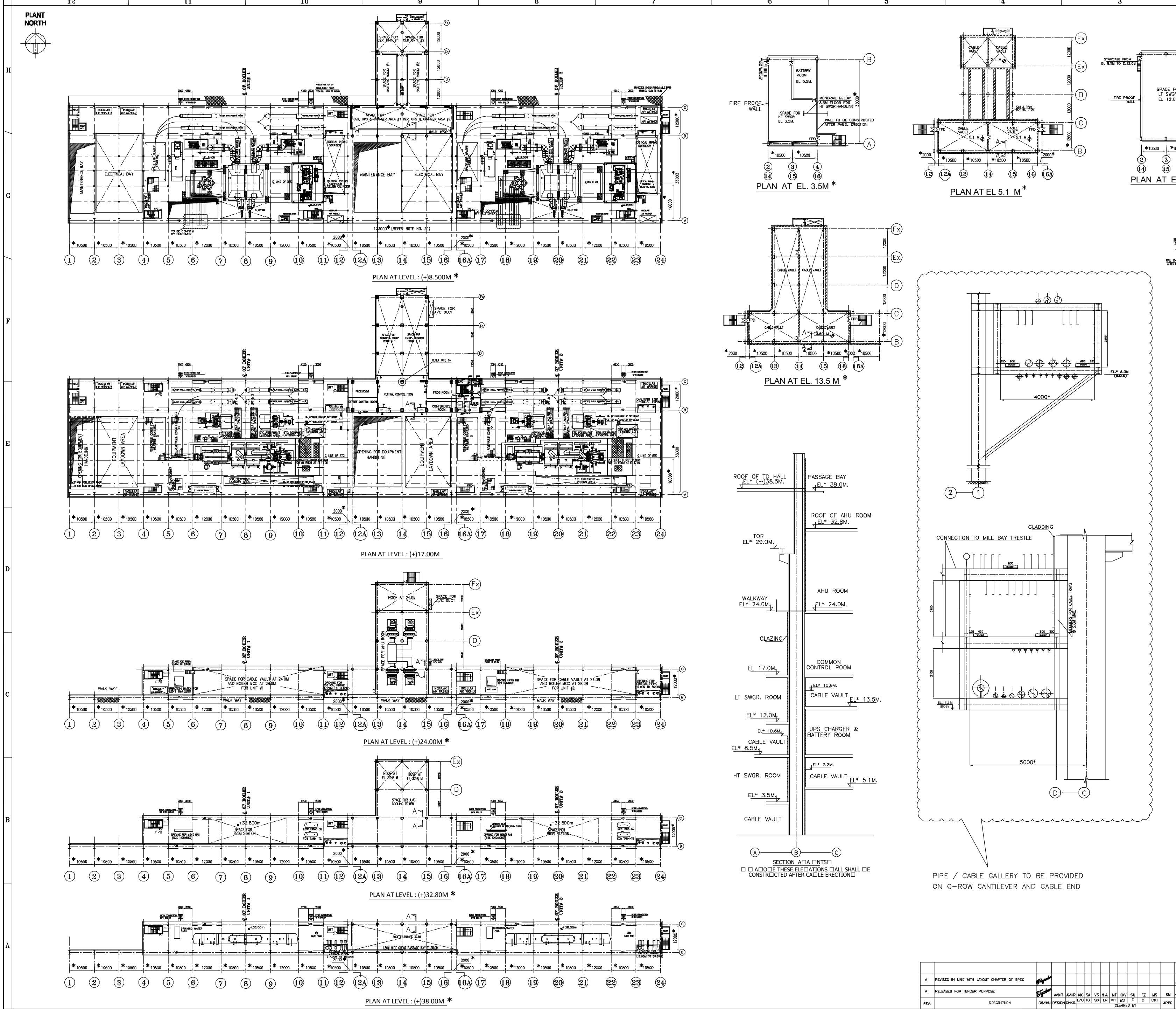
FOR INFORMATION PURPOSE ONLY

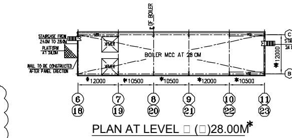
OWNER: THDC INDIA LIMITED (A JV of GOVT. OF INDIA & GOVT. OF UP.)
CONSULTANT: NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)
PROJECT: KHURJA SUPER THERMAL POWER PROJECT (2X660 MW)
TITLE: TG ISLAND PACKAGE LAYOUT OF DRAINS

REV NO	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
C	FOR TENDER PURPOSE ONLY										07.05.18
B	FOR TENDER PURPOSE ONLY										06.02.18
A	FOR TENDER PURPOSE ONLY										23.08.16

CLEARED BY

SIZE: A0 | SCALE: 1:8000 | DRG. NO.: 9915-371-POC-A-003 | REV. NO.: C





LEGEND

⊠	PIPE HATCH
═	VERTICAL BRACING
FPD	FIRE PROOF DOOR
▦	GRATING
▩	CHEQUERED PLATE
R	REMOVABLE
─●─	HAND RAILING
DD	DOUBLE DOOR

NOTES

1. FALSE CEILING LEVEL.

1A. FALSE CEILING LEVEL IN UPS, BATTERY CHARGER AND CER AREA SHALL BE EL 11.20 M i.e. 2.70 M ABOVE THE 8.5 M FLOOR LEVEL.

1B. FALSE CELLING HEIGHT IN CENTRAL CONTROL ROOM SHALL BE 3.65 M. AND FALSE CELLING HEIGHT IN CER AREA SHALL BE 3.0M.

2. BRICKWALL ABOVE FALSE CEILING AT 'B' ROW IN CCR AREA TO BE PROVIDED.

3. NO WATER/STEAM PIPES INCLUDING RAIN WATER DOWNCOMER SHALL BE ROUTED IN CCR/CER/BATTERY/UPS CHARGER ROOMS. RAIN WATER DOWN COMER SHALL BE ROUTED WITHIN COLUMN FLANGE ON A-ROW COLUMNS OF ELECTRICAL BAYS & IPBD BAY.

4. ALL DOORS ON C- ROW PROVIDED AT 8.5M & 17.0M, INTERCONNECTING WITH BOILER ARE OF DOUBLE DOOR TYPE TO AVOID INGRESS OF DUST TO MAIN PLANT BUILDING.

5. TO AVOID DUST INGRESS IN THE CCR/CER/UPS ROOM, FOLLOWING SHALL BE ENSURED:

   * DOUBLE DOOR ENTRANCE FOR AHU ROOM/ UPS ROOM/CR/CER.
   * FRESH AIR FAN FOR AHU ROOM SHALL HAVE SUCTION FROM TG HALL SIDE.
   * VENTING DAMPER FOR INERT GAS SYSTEM SHALL BE LOCATED TOWARDS TURBINE HALL SIDE/HEATER SIDE AND NOT ON BOILER SIDE.

6 NO VERTICAL BRACING SHALL BE PLACED INSIDE CER/CCR/ELECTRICAL BAY.

7. DIRECT SUNLIGHT FALLING ON LVS & OWS SHOULD BE AVOIDED BY PROVIDING TINTED GLASS TOWARDS TG HALL(B ROW).

8. FACILITIES LIKE TOILET (LADIES/GENTS) AND CONFERENCE ROOM SHALL BE PROVIDED NEAR THE CONTROL ROOM AS PER NORMS.

9. NO ROOF OVER DEAERATOR SHALL BE PROVIDE. HOWEVER BEAMS & COLUMNS SHALL BE PROVIDED BETWEEN AXIS 6-10 & 18-22 OVER DEAERATOR TO SUPPORT THE PIPING,
WITH NO ENCLOSURE ON SIDE. FURTHER, DEAERATOR SUPPORTS SHALL REST ON BEAMS ONLY.

10. LAYOUT OF HP, IP, LP CYLINDERS FOR STEAM TURBINE SHOWN HERE ARE INDICATIVE ONLY.

11. THE LOCATION/BAYS INDICATED FOR MODULAR TYPE AIR WASHER UNITS ARE TENTATIVE AND ARE SUBJECTED TO CHANGE DURING DETAILED ENGG.

12. VOID

13. FOR OTHER NOTES REFER DRG. NO. 9915-999-POM-F-001.

14. COLUMNS IN CONTROL TOWER SHALL BE OF MINIMUM DEPTH AS POSSIBLE.

15 WASH BASIN (EMERGENCY SHOWER) SHALL BE PROVIDED IN C&I & ELECTRICAL BATTERY ROOMS IN EACH UNIT.

16. LOCATION OF VERTICAL BRACING SHOWN ARE INDICATIVE.

17 BAY ALLOCATED FOR CRITICAL PIPING IN TG BUILDING ARE TENTATIVE AND SHALL BE FINALIZED DURING DETAILED ENGINEERING STAGE

18. LOCATION OF BOILER MCC SHOWN ARE INDICATIVE ONLY AND THE SAME SHALL BE FINALIZED DURING DETAIL ENGINEERING.

19. DIMENSION THUS (*) MARKED ARE INDICATIVE ONLY.

20. UNIT PITCHING MAY VARY FROM 133m TO 142m. SAME SHALL BE DECIDED BY OWNER DURING DETAILED ENGINEERING, BASED ON SG ISLAND & TG ISLAND PACKAGES VENDOR DATA.

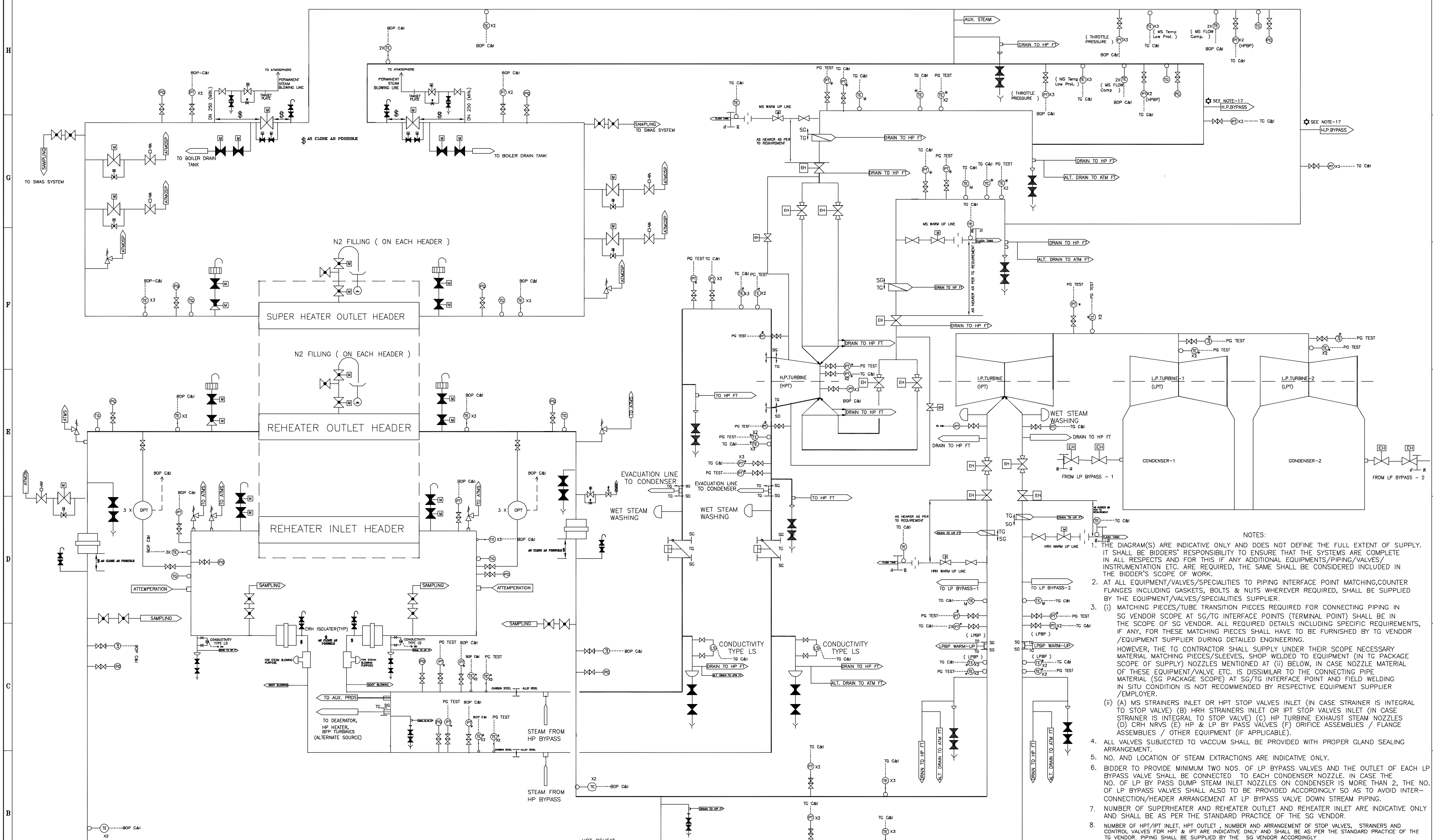
FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	L/O	TG	SG	LP	MH	WS	E	C	C&I	APPD	DATE
A	REVISED IN LINE WITH LAYOUT CHAPTER OF SPEC	[signature]													26 04 19
A	RELEASED FOR TENDER PURPOSE	[signature]	AVKR	AVKR	AK	SA	VS	N.A	MT	KKV	SU	FZ	MS	SM	23 04 18

CLEARED BY

OWNER	**THDC INDIA LIMITED** (A JV OF GOVT. OF INDIA & GOVT. OF UP)
CONSULTANT	**NTPC Limited** (A GOVT. OF INDIA ENTERPRISE) CONSULTANCY WING
PROJECT	KHURJA SUPER THERMAL POWER PROJECT (2X660 MW PRESENT PROPOSAL □ 1X660 MW FUTURE PROVISION)
TITLE	MAIN PLANT LAYOUT PLAN AT EL 8.5/17.5M/ 24.0M/28.0M/32.0M/38.0M
SIZE A0 / SCALE / DRG.NO.	9915-999-POM-F-002 — REV. B

AUTOCAD DRG. NO. 9915-999-POM-F-002Dwg. (26-04-2019)



NOTES:

1. THE DIAGRAM(S) ARE INDICATIVE ONLY AND DOES NOT DEFINE THE FULL EXTENT OF SUPPLY. IT SHALL BE BIDDERS' RESPONSIBILITY TO ENSURE THAT THE SYSTEMS ARE COMPLETE IN ALL RESPECTS AND FOR THIS IF ANY ADDITIONAL EQUIPMENTS/PIPING/VALVES/ INSTRUMENTATION ETC. ARE REQUIRED, THE SAME SHALL BE CONSIDERED INCLUDED IN THE BIDDER'S SCOPE OF WORK.
2. AT ALL EQUIPMENT/VALVES/SPECIALITIES TO PIPING INTERFACE POINT MATCHING,COUNTER FLANGES INCLUDING GASKETS, BOLTS & NUTS WHEREVER REQUIRED, SHALL BE SUPPLIED BY THE EQUIPMENT/VALVES/SPECIALITIES SUPPLIER.
3. (i) MATCHING PIECES/TUBE TRANSITION PIECES REQUIRED FOR CONNECTING PIPING IN SG VENDOR SCOPE AT SG/TG INTERFACE POINTS (TERMINAL POINT) SHALL BE IN THE SCOPE OF SG VENDOR. ALL REQUIRED DETAILS INCLUDING SPECIFIC REQUIREMENTS, IF ANY, FOR THESE MATCHING PIECES SHALL HAVE TO BE FURNISHED BY TG VENDOR /EQUIPMENT SUPPLIER DURING DETAILED ENGINEERING.
   HOWEVER, THE TG CONTRACTOR SHALL SUPPLY UNDER THEIR SCOPE NECESSARY MATERIAL MATCHING PIECES/SLEEVES, SHOP WELDED TO EQUIPMENT (IN TG PACKAGE SCOPE OF SUPPLY) NOZZLES MENTIONED AT (ii) BELOW, IN CASE NOZZLE MATERIAL OF THESE EQUIPMENT/VALVE ETC. IS DISSIMILAR TO THE CONNECTING PIPE MATERIAL (SG PACKAGE SCOPE) AT SG/TG INTERFACE POINT AND FIELD WELDING IN SITU CONDITION IS NOT RECOMMENDED BY RESPECTIVE EQUIPMENT SUPPLIER /EMPLOYER.
   (ii) (A) MS STRAINERS INLET OR HPT STOP VALVES INLET (IN CASE STRAINER IS INTEGRAL TO STOP VALVE) (B) HRH STRAINERS INLET OR IPT STOP VALVES INLET (IN CASE STRAINER IS INTEGRAL TO STOP VALVE) (C) HP TURBINE EXHAUST STEAM NOZZLES (D) CRH NRVS (E) HP & LP BY PASS VALVES (F) ORIFICE ASSEMBLIES / FLANGE ASSEMBLIES / OTHER EQUIPMENT (IF APPLICABLE).
4. ALL VALVES SUBJECTED TO VACCUM SHALL BE PROVIDED WITH PROPER GLAND SEALING ARRANGEMENT.
5. NO. AND LOCATION OF STEAM EXTRACTIONS ARE INDICATIVE ONLY.
6. BIDDER TO PROVIDE MINIMUM TWO NOS. OF LP BYPASS VALVES AND THE OUTLET OF EACH LP BYPASS VALVE SHALL BE CONNECTED TO EACH CONDENSER NOZZLE. IN CASE THE NO. OF LP BY PASS DUMP STEAM INLET NOZZLES ON CONDENSER IS MORE THAN 2, THE NO. OF LP BYPASS VALVES SHALL ALSO TO BE PROVIDED ACCORDINGLY SO AS TO AVOID INTER-CONNECTION/HEADER ARRANGEMENT AT LP BYPASS VALVE DOWN STREAM PIPING.
7. NUMBER OF SUPERHEATER AND REHEATER OUTLET AND REHEATER INLET ARE INDICATIVE ONLY AND SHALL BE AS PER THE STANDARD PRACTICE OF THE SG VENDOR.
8. NUMBER OF HPT/IPT INLET, HPT OUTLET , NUMBER AND ARRANGEMENT OF STOP VALVES, STRAINERS AND CONTROL VALVES FOR HPT & IPT ARE INDICATIVE ONLY AND SHALL BE AS PER THE STANDARD PRACTICE OF THE TG VENDOR. PIPING SHALL BE SUPPLIED BY THE SG VENDOR ACCORDINGLY
9. REFER NOTE 7 & 8. THE QUANTITY OF INSTRUMENTS OF THE ABOVE PIPING SHALL BE SUPPLIED BY THE RESPECTIVE VENDOR ACCORDINGLY.
10. NUMBER OF SAFETY VALVES SHOWN ON PIPING IS INDICATIVE ONLY. THIS SHALL BE AS PER SPECIFICATION/MANUFACTURER'S STANDARD PRACTICE.
11. PIPING AND EQUIPMENT DRAINS SHOWN ARE INDICATIVE ONLY. REQUIREMENT SHALL BE FINALISED BASED ON PROCESS/LAYOUT CONSIDERATIONS AS WELL AS ASME TDP REQUIREMENTS.
12. ALL EQUIPMENTS AND PIPING SHALL BE PROVIDED WITH PROPER DRAINAGE AND VENTING ARRANGEMENT. THE DRAIN SHALL BE LED TO THE NEAREST AVAILABLE PLANT DRAIN. INADDITION TO WHATEVER IS SHOWN IN THE DRAWING, ALL THE REQUIREMENTS OF ASME-TDP-1 (LATEST) SHALL BE MET.
13. FOR PG TEST OF EQUIPMENT/ SYSTEM AND SAMPLING, STUBS AND TAPPINGS REQUIRED ON THE PIPING SHALL BE SUPPLIED AND ERECTED BY THE PIPING SUPPLIER, IRRESPECTIVE OF SCOPE OF SUPPLY OF EQUIPMENT FOR WHICH PG TEST INSTRUMENTS ARE REQUIRED TO BE PROVIDED ON PIPINGS. THE DETAIL OF STUBS REQUIRED SHALL BE FURNISHED BY EQUIPMENT SUPPLIER DURING DETAIL ENGINEERING.
14. FOR DETAILS OF IMPULSE/ROOT VALVES ETC. REFER C&I INSTALLATION/SOURCE CONNECTION DRAWING NOs: 0000-999-POI-A-022 TO 0000-999-POI-A-035 FOR SG ISLAND PACKAGE AND DRAWING NOs : 0000-110-POI-A-022 TO 0000-110-POI-A-035 FOR STG ISLAND PACKAGE.
15. IN CASE STEAM TURBINES ARE HAVING STEAM INLET NOZZLES ON ITS TOP HALF PORTION, FLANGE JOINTS SHALL BE PROVIDED ON EACH PIPING CONNECTED TO THESE NOZZLES TO FACILITATE REMOVAL OF TURBINE TOP CASING DURING MAINTENANCE WITHOUT CUTTING THE PIPES. ACCORDINGLY, IN THE ABOVE CASE, THESE FLANGES (COMPLETE FLANGE ASSEMBLY) SHALL BE SUPPLIED BY TG CONTRACTOR AND SHALL BE ERECTED BY SG CONTRACTOR.
16 FOR KKS CODES, REFER DRWG NO. 0000-110-POI-G-001,R-0.
17. ✡ BIDDER MAY ALSO OFFER TAP-OFF FOR HP BYPASS FROM MS EQUALISING LINE IN PLACE OF INDEPENDENT TAP-OFFS FROM BOTH MAIN STEAM LEADS AS SHOWN.
18. IN PLACE OF DOUBLE LEADS FOR COLD REHEAT, AS SHOWN, THE BIDDER MAY ALSO OFFER SINGLE LEAD AFTER CRH NRV. THE INSTRUMENTATION SHALL BE AS PER THE PHILOSOPHY MENTIONED IN THE TECHNICAL SPECIFICATION.
19. IN ADDITION OF INSTRUMENTS INDICATED IN TENDER P&ID ANY OTHER INSTRUMENT WHICH ARE REQUIRED FOR CONTROL,INTERLOCKS AND PROTECTIONS OF BIDDER SUPPLIED BINARY AND MODULATING DRIVES AND MONITORING CRITICAL PARAMETERS SHALL BE IN THE SCOPE OF BIDDER.
20. MS WARM UP & HRH WARM UP LINE SHALL BE PROVIDED BY SG VENDOR IN EACH LINE/LEAD IF REQUIRED BY TG VENDOR.
21. **The specification of instruments with * mark shall be identical (i.e. same accuracy) and accuracy level of these instruments shall conform to ASME PTC requirements for PG test. It shall be ensured that all these instruments are necessarily supplied and erected at the same time so as to facilitate conductance of PG test during initial operation.**
22. **Instruments which are shown as connected to PG test shall be used for PG test and shall be permanently installed in the piping and kept wired up to the PG test data logger/ PG test calculation server (indicated in Functional Guarantees and Liquidated damages) even after conductance of the PG test & shall be the property of NTPC.Instruments shown for PG test are minimum in number. In case additional instruments over and above those indicated here as connected to PG test are required by contractor for conductance of PG test, then the same shall be supplied within this contract with specification conforming to ASME PTC requirements.**

FOR TENDER PURPOSE ONLY

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	CLEARED BY		APPD.	DATE
A	RELEASED FOR TENDER	AS	BK	AKV	M	C&I	AA	02/05/19

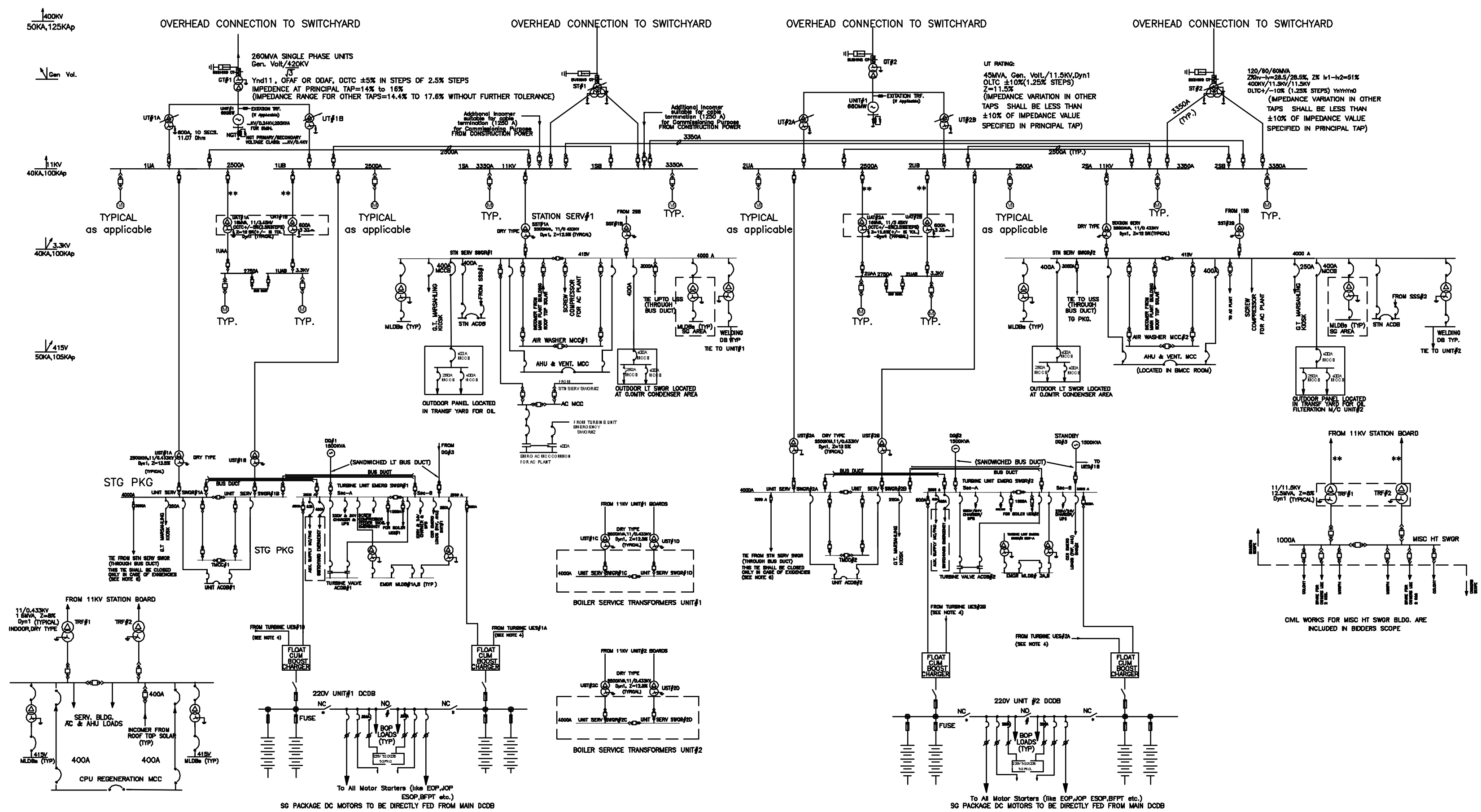
OWNER: THDC INDIA LIMITED (A JOINT VENTURE OF GOVT. OF INDIA & GOVT. OF UP)

CONSULTANT: NTPC Ltd. (A Government of India Enterprise) ENGINEERING DIVISION

PROJECT: KHURJA SUPER THERMAL POWER PROJECT (STAGE- I) (2X660 MW)

TITLE: MAIN STEAM, HOT REHEAT & COLD REHEAT P&ID

SIZE	SCALE	DRG NO.	REV. NO.
A-1	NTS	9915-999-POM-A-004	B



NOTES:

1. ONE NO. DIESEL GENERATOR PROVIDED BY BIDDER PER UNIT IS CONNECTED TO THE RESPECTIVE TURBINE UNIT EMERGENCY BOARD. ONE STANDBY DG SET ,COMMON FOR TWO UNITS TO BE PROVIDED BY BIDDER TO CATER THE EMERGENCY REQUIREMENT OF ONE UNIT AT A TIME.
2. CHANGEOVER FACILITY

A.) 11KV SYSTEM UNIT BUSES EMPLOY FAST BUS TRANSFER SCHEME FOR RESTORATION OF SUPPLY FROM STATION TRANSFORMER IN CASE OF SUPPLY FAILURE FROM THE RESPECTIVE UNIT TRANSFORMER. MANUAL LIVE CHANGEOVER WITH CHECK SYNCHRONISATION AND SLOW AUTO CHANGEOVER FACILITY AS A BACK-UP IS ALSO PROVIDED FOR THESE BUSES. 11KV SYSTEM STATION BUSES EMPLOY MANUAL LIVE CHANGEOVER.

B.) 3.3KV UNIT BUSES ARE PROVIDED WITH FAST BUS CHANGEOVER FOR RESTORATION OF SUPPLY IN CASE OF OUTRAGE OF ANY ONE OF THE UNIT AUX. TRANSFORMER. MANUAL LIVE CHANGOVER WITH CHECK SYNCHRONISATION AND SLOW AUTO CHANGEOVER FACILITY AS A BACK-UP IS ALSO PROVIDED FOR THESE BUSES. OTHER 3.3KV SYSTEM BUSES ARE PROVIDED WITH MANUAL LIVE CHANGEOVER WITH CHECK SYNCHRONISATION AS WELL AS AUTOMATIC SLOW CHANGEOVER

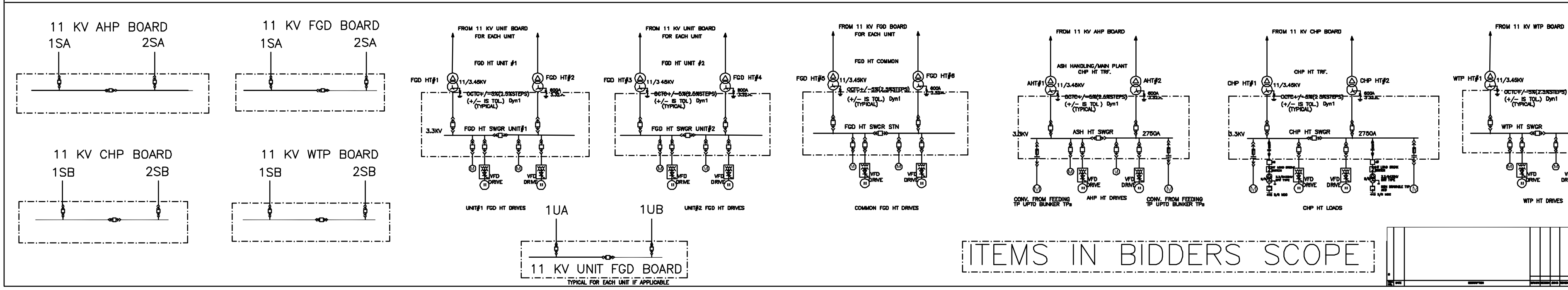
C.) ALL 415V SYSTEM BUS INCOMERS FED FROM TRANSFORMERS ARE PROVIDED WITH MANUAL LIVE/DEAD BUS CLOSING FACILITY. BUS COUPLERS ARE PROVIDED WITH AUTO DEAD BUS CLOSING.

D.) UNIT 415V BUS SECTIONS ARE ADDITIONALLY PROVIDED WITH MANUAL LIVE CHANGEOVER FACILITY WITH CHECK SYNCHRONISATION AND AUTOMATIC CHANGEOVER, WITH THEIR RESPECTIVE DG BUS

E.) 415V EMERGENCY BOARDS ARE NORMALLY FED FROM RESPECTIVE UNIT LV BOARDS. IN THE EVENT OF FAILURE OF NORMAL POWER SUPPLY. MAIN AND STANDBY DG WILL AUTOSTART SIMULTANEOUSLY AND UPON ATTAINING NORMAL VOLTAGE AND FREQUENCY, MAIN DG INCOMERS & UES B/C WILL BE CLOSED AUTOMATICALLY TO THE RESPECTIVE UNIT EMERGENCY BOARD AND STANDBY DG INCOMER IF REQUIRED WILL BE CLOSED MANUALLY.

3. THE SELECTION OF LT FEEDERS SHALL BE AS INDICATED BELOW:
   (i) UPTO 400 A – MCCB
   (ii) ABOVE 400 A – BREAKER
4. EACH MAIN PLANT DC SYSTEM SHALL BE FED THROUGH TWO NOS. DC BATTERY AND TWO NOS. FLOAT CUM BOOST CHARGERS AS INDICATED. EACH BATTERY SHALL HAVE RATING OF 2X990AH IN CASE OF NI-CD OR 2X1500AH FOR LEAD ACID BATTERIES. EACH DC CHARGER SHALL BE RATED FOR 220V DC, 800AMP.
5. CONTROL AND PROTECTION SUPPLIES FOR ALL SWITCHGEARS/DBS/CONTROL PANELS SHALL BE FED FROM TWO DIFFERENT SOURCES/DIFFERENT SECTIONS.
6. IPB FAULT LEVEL:
   FAULT LEVEL SHALL BE DECIDED BASED ON GENERATOR,GT,UT PARAMETERS AND 400KV SYSTEM FAULT OF 50 KA, 1 SEC.,
7. OWNER'S REQUIREMENT TO BE CONSIDERED IN CONJUNCTION WITH SCOPE CHAPTER.
8. ALL ROOFTOP SOLAR INCOMER FEEDER SHALL HAVE 0.2s CLASS METERING
9. SUPPLY, ERECTION, TESTING AND COMMISSIONING OF ONE 420KV, 125MVAR BUS REACTOR AND TWO 420KV, 80MVAR LINE REACTOR ALONG WITH NGR AND LA IS IN BIDDERS SCOPE. HOWEVER RELATED CIVIL WORKS ARE NOT IS SCOPE OF THIS PACKAGE.
10. ALL GT, ST, UT, 400KV BUS REACTOR AND ALL INDOOR TRANSFORMER INDICATED IN TENDER SLD ARE IN BIDDERS SCOPE. NGR FOR TRANSFORMERS UNDER BIDDERS SCOPE (WHEREVER APPLICABLE) ARE ALSO INCLUDED IN BIDDERS SCOPE OF SUPPLY
11. SUPPLY, ERECTION AND COMMISSIONING OF HT, LT AND CONTROL CABLES FOR ALL CASES WHERE EQUIPMENTS ON BOTH SIDES ARE UNDER SCOPE OF THIS PACKAGE ARE INCLUDED IN SCOPE OF THIS PACKAGE. ALL HT BUS DUCTS ARE IN BIDDERS SCOPE.
    **FURTHER ALL INTERCONNECTIONS AS INDICATED IN SLD ARE ALSO IN BIDDERS SCOPE.
12. SIZING OF POWER/INDOOR TRANSFORMRS,DG SET AND DC SYSTEM IS EXCLUDED FROM BIDDERS SCOPE. RATINGS FOR THE EQUIPMENTS ARE AS INDICATED IN THIS SLD.
13. RATINGS AND QUANTITY OF REACTORS INDICATED AT NOTE NO. 9 ABOVE IS TENTATIVE AND SHALL BE FINALIZED DURING DETAILED ENGINEERING NECESSARY UNIT RATE FOR REACTOR OF BOTH RATINGS SHALL BE PROVIDED BY BIDDER IN BPS FOR QUANTITY VARIATION BASED ON ACTUAL QUANTITY AND RATING SUPPLIED FOR THE PROJECT.
14. ITEMS INSIDE BOX ARE EXCLUDED FROM BIDDERS SCOPE

OUTDOOR TRANSFORMERS, HT CABLES FOR TIE/TRANSFORMER INCOMERS & OUTGONG FEEDERS, CIVIL WORKS OF THE SWITCHGEAR ROOMS FOR THE BELOW SUBSYSTEMS ARE EXCLUDED FROM BIDDERS SCOPE. SUPPLY ERECTION TESTING COMISSIONING OF HT SWITCHGEAR/HT BUSDUCT AS REQUIRED FOR OWNERS SUBSYSTEM INDICATED BELOW IS IN BIDDERS SCOPE. FOR FEEDER DETAILS OF HT SWITCHGEAR REQUIRED FOR OWNERS USE REFER ANNEX-A TO SUBSECTION-IIB



FOR TENDER PURPOSE ONLY

OWNER	THDC INDIA LIMITED
CONSULTANT	NTPC Limited
PROJECT	KHURJA STPP STAGE-I (2 x 660MW)
TITLE	SINGLE LINE DIAGRAM- STG PKG.
SIZE A1 / SCALE NA / DRAWING NO.	9915-999-POE-J-002
REV NO.	C

GENERATORS & AUXILIARIES.

PROCESS CHECK FOR STATIC PARTS GENERATOR / EXCITOR

TESTS / ITEM/ COMPONENTS /PROCESS	Visual & dimension	Chem. Prop.(raw material)	Heat treatment	Mech.Prop.(raw material as applicable)	Impact.(raw material)	Hydraulic test	Pneumatic test	RT/UT (10% for butt weld)	MPI/DPT(All welds of trunion & base plate, sample on other)	Relative permeability *	Ferrite content	DIN 43760, IS 2848,7358	DIN 48124
Sheet and Fabrication -END shield	Y	Y	Y	Y	Y	Y1	Y1	Y	Y				
-Stator casing	Y	Y	Y	Y	Y	Y1	Y1	Y	Y				
-Bushing boxes	Y	Y	Y	Y	Y	Y1	Y1	Y	Y				
-Terminal plates	Y	Y	Y	Y	Y	Y1	Y1		Y				
-Manhole and covers	Y	Y	Y	Y	Y	Y1	Y1		Y				
-Trunniuns	Y	Y	Y	Y	Y			Y	Y				
Core bar	Y	Y		Y									
Press ring	Y	Y		Y					Y				
Core bolt (insulated)	Y	Y		Y				Y	Y				
Gaskets	Y			Y									
Bearing and Hydrogen Seals	Y	Y		Y				Y2					
Terminal Bushing													Y
RTD/ Thermocouple												Y	
Additional checks for -Non magnetic Components										Y			
-Non magnetic Components welding											Y		

Y-Test applicable, Y1-For Hydrogen cooled machine, Y2-UT on Babbitt for bearing, * - As per OEM standard practice.

Note:

1. This is an indicative list of tests / checks. The manufacturer is to furnish a detailed Quality Plan indicating the practice and procedure along with relevant supporting documents.
2. All generators shall be assembled at works and shall be tested to verify/ensure design and workman ship in accordance with IEC-34, VDE 0530, IEEE 115, IEEE 43. The manufacturer shall submit detailed test procedure which clearly specify test set up, instruments to be used, acceptance norms (wherever applicable) recording of different parameter, interval of recording, precautions etc.
3. Cooler, control panel and other auxiliaries (as applicable) to be suitably tested as per tests covered in the specification.
4. Test requirements of primary water system, seal oil system and Hydrogen cooling system shall be as per tests specified for similar items under respective tables covered in this section.

GENERATORS & AUXILIARIES
PROCESS CHECK FOR CORE GENERATOR/EXCITOR

TESTS / ITEM/ COMPONENTS / PROCESS	Specific loss before and after ageing	Magnetization	Anisotropy of losses	Stacking factor	Burr level	chem., elect., viscosity cure time, solid content, dielectric properties	Dimension & surface (uniformity of varnish coat)	Spot weld check
Core lamination	Y	Y	Y	Y			Y	
After punching Insulated core Laminations					Y		Y	
Check for varnish						Y		
Ventilation Stamping								Y
Core assembly							Y	

TESTS / ITEM/ COMPONENTS / PROCESS	Process check including Heating & pressure application	Insulation test of insulated core tension bolt & core bar	Functional check of ventilation ducts	Hot spot at rated flux density by infra red camera & ELCID *	Location of temp. detectors	Iron loss at rated flux density
CORE assembly (additional Checks for Generator)	Y	Y	Y	Y	Y	Y

Y-Test applicable

*** In case of any constraint of manufacturer to carry out the test at rated flux , testing at reduced flux as per manufacturer guidelines to be proposed to Owner for review & approval.**

GENERATORS & AUXILIARIES
PROCESS CHECK FOR CORE GENERATOR/EXCITOR

ITEM/ COMPONENTS / PROCESS / TESTS	Winding copper and connecting bus bars	Insulated conductor	Insulation material	Manufacturing Winding bar & phase bar	Winding laying	Water supply hoses	Winding support ring	Connection between bars	wound stator
Support arrangement					Y	Y			
Type test reports for similar type of bars for heating cycle test, thermal stability test @				Y					
Slot wedge tightness & radial movement									Y
Thermal shock test Baroscopic Examination of brazed water box				Y1					
Inter strand Insulation test				Y				Y2	
Dielectric test at elevated And room temp.		Y							
Vibration fatigue *						Y			
Magnetic permeability of metallic parts						Y			
Reactance of stator winding									Y
Corona protection resistance				Y					
Partial Discharge test				Y#					
Tan delta and delta, tan delta Up to 1.2 un				Y					Y
Check on RTD + location winding					Y				
Helium leak test & PR. test				Y		Y			
Flow test				Y1					Y1
Process check				Y	Y				
X-Ray of Water box				Y1					
Brazing procedure				Y				Y	
Physical prop.			Y				Y		
Electric test			Y	Y	Y				
Dimension/visual		Y	Y	Y	Y	Y	Y		
Dielectric test		Y		Y	Y	Y			
Flexibility of bending temp.		Y							
Insulation adhesion		Y							
Eddy current & pr. Test	Y1								
Metallography prop.	Y								
Resistivity/Resistance	Y								
Chem. prop (sample)	Y		Y			Y	Y		
Mech. prop (sample)	Y		Y			Y			

Y - Test Applicable, Y1- Applicable for hollow conductor, * As per manufacturer established practice, Y2: Not applicable for connection between bars through contact–sleeve (lug), Y#: OEM practice shall be followed, @: Type test reports for similar type of bars for heating cycle test, thermal stability test, and voltage endurance test manufactured from same works from which bars are to be sourced is acceptable if conducted within 5 years of bid opening.

GENERATORS & AUXILIARIES

PROCESS CHECK FOR ROTOR AND ASSEMBLY (GENERATOR/EXCITOR)

TESTS / ITEM/ COMPONENTS / PROCESS	Rep. sample tensile stress	Rep. sample 0.2 limit	Rep. sample elongation	Hardness on Sample	Impact check on sample	Rep. sample Chem. prop.	NDTT, FATT (as applicable)	Process check including heat treatment (as applicable)	Ultrasonic test/RT (at suppliers works and after preliminary machining)	Sulphur Prints Check(Depending on proveness)	Flux carrying capacity / Magnetic prop *	Boroscopic Examination
Rotor forging & slip ring shaft	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Rotor end retaining ring, locking ring & Slip ring forgings, diode wheel	Y	Y	Y		Y	Y		Y	Y			
Rotor wedges, damper Wedges.	Y		Y			Y		Y	Y			
Rotor winding copper CC-bolts & D-leads	Y		Y			Y		Y				
Rotor slot boxes/ insulating material						Y						
Coil manufacture												
Rotor winding								Y				
Winding connection studs & assembly												
Complete rotor								Y				
Test on completed rotor at various speed up to rated speed												
Test on completed rotor before & after over speed												
Fan hubs/blades						Y		Y	Y			
GENERATOR assembly												
Diode wheel Assembly												
Permanent magnet					Y						Y	
EXCITER assembly												

Y- Test Applicable * Not applicable for slip ring shaft of SEE

.GENERATORS & AUXILIARIES

PROCESS CHECK FOR ROTOR AND ASSEMBLY (GENERATOR/EXCITOR)

TESTS / ITEM/ COMPONENTS /PROCESS	MPI/DP/NDT test	Visual/Dimension/Cleanlines	Adhesion, thickness of Coat on silver plating If applicable	Electrical conductivity and Oxygen content	Mech. test on sample	Electrical test (∑)	Resistance measurement	Vent hole blockage	Helium leak test for Hydrogen cooled M/C	Inter turn test	Dielectric test
Rotor forging & slip ring shaft	Y	Y									
Rotor end retaining ring & cover, locking ring & Slip ring forgings, diode wheel	Y		Y								
Rotor winding copper, rotor wedges, damper Wedges, CC-bolts & D-leads	Y		Y	Y1		Y					
Rotor slot boxes/ insulating material					Y	Y					
Coil manufacture		Y									
Rotor winding	Y	Y				Y		Y		Y	Y
Winding connection studs & assembly	Y				Y				Y		Y
Complete rotor							Y				Y
Test on completed rotor at various speed up to rated speed										Y	Y
Test on completed rotor before & after overspeed		Y					Y			Y	Y
Fan hubs/blades	Y	Y									
GENERATOR assembly		Y									
Diode wheel Assembly		Y									
Permanent magnet		Y			Y						
EXCITOR assembly		Y									

Y-Test Applicable , Y1: Oxygen content applicable for Rotor winding copper & D Lead,
∑ NOTE- Dielectric test & conductivity test etc. as applicable

GENERATORS & AUXILIARIES

PROCESS CHECK FOR ROTOR AND ASSEMBLY (GENERATOR/EXCITOR)

TESTS / ITEM/ COMPONENTS /PROCESS	Insulation Resistance	PI	Radial run out/alignment	Impedance measurement/ RSO (repetitive surge oscillograph)	Dynamic balancing ISO 5406, 2372, 1940	Over speed test (120%) for 2 minute	Axial run out	Metallography examination *	Torque on joint bolts	Fitting and locking of Balancing weights	Brazer and brazing procedure
Rotor forging & slip ring shaft								Y			
Rotor end retaining ring & cover, locking ring & Slip ring forgings, diode wheel											
CC-bolts									Y		
Rotor slot boxes/ insulating material											
Coil manufacture											Y
Rotor winding											Y
Winding connection studs & assembly	Y										
Complete rotor	Y		Y	Y	Y	Y			Y		
Test on completed rotor at various speed up to rated speed				Y							
Test on completed rotor before & after overspeed	Y		Y	Y							
Fan hubs/blades										Y	
GENERATOR assembly	Y	Y	Y				Y		Y	Y	Y
Diode wheel Assembly			Y				Y		Y	Y	
Permanent magnet											
EXCITOR assembly			Y						Y	Y	

Y-Test applicable * - As per OEM standard practice.

GENERATORS & AUXILIARIES

ADDITIONAL CHECK FOR EXCITOR

TESTS / ITEM/ COMPONENTS /PROCESS	Routine Test as per applicable std	As per IEC-76 / Applicable std	Pole parallelism & polarity	Mech. chem. & Magnetic prop.(as applicable)	Functional check	Insulation resistance	IEEE/ANSI-C37.18 Or IEC 60947-2	As per applicable standards	As per specification	Dimensional and visual
Fuse diode & filter Circuit	Y									Y
Aux. Transformer (if applicable)		Y								
Carbon brush holder & housing				Y	Y				Y	Y
Cable									Y	
PMG & Exciter stator			Y	Y		Y				
Bandaging wire				Y						
Field discharge resistor					Y					
Bearing, exciter armature field, axis coil , RTD						Y				
Excitation Transformer		Y								
Thyristors									Y	
Field breaker					Y		Y			
Bus duct AC/DC								Y		
Voltage Regulator									Y	
Carbon brush				Y	Y				Y	Y

Y - Test applicable

GENERATOR AND AUXILIARIES

FINAL ACCEPTANCE TEST GENERATOR/EXCITOR

ITEM/ COMPONENTS /PROCESS \ TESTS	Works run test on generator to be conducted on first unit of each rating per contract to establish the performance characteristics / designated attributes	On total winding/phase at interval of 0.2 U_n for generator	Condition after dismantling (after works run test)	Works test on brush less exciter	PMG works test	Full load for PMG & convertor assembly	Convertor assembly for SEE	Static excitation system
Partial Discharge	Y							
Visual and dimension	Y							
Vibration Measurement	Y							
Winding Overhang			Y					
Seal Ring. Liners			Y					
Bearing oil catcher			Y					
Rotor journal			Y					
Tan delta, delta tan delta	Y	Y						
Capacitance measurement	Y	Y						
RTD, BTD Check	Y							
HV test (except electronic circuit)	Y			Y	Y		Y	Y
Shaft voltage	Y							
Phase seq. voltage	Y				Y			
Polarization index	Y							
Insulation resistance	Y			Y	Y		Y	Y
Efficiency By separation of Losses	Y							
Steady state reactance's	Y							
Record Aux. parameters	Y							
SCC	Y							
OCC	Y			Y	Y			
Voltage regulation					Y			
Function check							Y	Y
Heat run test	Y			Y	Y	Y		
Rotor impedance at various speeds in steps of 200 rpm	Y							
Resistance measurement	Y			Y	Y			
Gas tightness for Hydrogen cooled M/C	Y							

Y – Test Applicable

GENERATORS & AUXILIARIES

FINAL ACCEPTANCE TEST GENERATOR/EXCITOR

ITEM/ COMPONENTS /PROCESS \ TESTS	Seal rings, liners	Winding Overhang	Vibration measurement	No load	Load characteristics	Characteristics of search coil, quad, axis	Ripple content	As per specification	Visual & dimension	Partial discharge
Works test on brush less exciter			Y	Y	Y	Y			Y	
PMG works test				Y	Y					
Static excitation system							Y	Y	Y	

Y - Test Applicable

PROPOSED COAL CHARACTERISTICS FOR KHURJA(2X660 MW)

APPENDIX-II

S.No.	Characteristics (as received basis)	Range of 95 % coal supplies			Range of 5 % coal supplies	
1.0	PROXIMATE ANALYSIS	Design	Worst	Best		
1.1	Total Moisture (%)	12	14	11.0	11-15	
1.2	Ash (%)	32	35	28	28-40	
1.3	Volatile Matter (%)	24	23	25	22-26	
1.4	Fixed Carbon (%)	32	28	36.0	28-36	
1.5	Total (%)	100	100	100		
2.0	ULTIMATE ANALYSIS					
2.1	Carbon (%)	42.3	37.81	46.83	35.21-45.4	
2.2	Hydrogen (%)	3.2	2.8	3.3	2.8-3.9	
2.3	Sulphur (%)	0.4	0.6	0.3	0.3-0.6	
2.4	Nitrogen(%)	1	0.58	1.3	0.58-1.4	
2.5	Oxygen(%)(By difference)	8.73	8.72	8.77	8.5-9.0	
2.6	Carbonates (%)	0.27	0.38	0.45	0.27-0.45	
2.7	Phosphorous(%)	0.06	0.06	0.04	0.04-0.06	
2.8	Total Moisture (%)	12	14	11.0	11.0-15.0	
0.04	Ash (%)	32	35	28	28-40.0	
3	Chloride	0.04	0.05	0.01	0.01-0.04	
3.1	Floride					
2.13	Trace Elements (PPM)					
2.14	Arsenic	0.025	0.03	0.02	0.015-0.035	
2.15	Lead	30	32	10	35-10	
2.16	Mercury	0.06	0.1	0.02	0.01-0.15	
2.17	Selenium	0.03	0.1	0.01	0.2-0.01	
2.18	Total	100	100	100		
2.10	GCV (Kcal/Kg)	4250	3700	4800	3600-4800	
2.11	Hard Grove Index	60	52	65	50-65	
2.12	YGP (mg/kg)	70	75	70	85-70	
3.0	ASH ANALYSIS					
3.1	Silica (%)	58.2	59.54	58.00	58.1-63	
3.2	Alumina(%)	28	26.3	27.20	22.2-26.1	
3.3	Iron Oxide (%)	6.1	6.4	7.60	8.3-11.5	
3.4	Titania	1.85	1.72	1.80	0.82-1.2	
3.5	Phosphoric Anhydride (%)	1.91	1.57	0.48	0.48-1.91	
3.6	Lime (%)	1.7	3.2	3.30	1.78-3.5	
3.7	Magnesia (%)	0.7	0.6	0.50	0.5-0.9	
3.8	Sulphuric Anhydride (%)	0.29	0.25	0.40	0.12-0.43	
3.9	Sodium Oxide (%)	0.3	0.1	0.30	0.1-0.32	
3.10	Potassium oxide	0.95	0.32	0.42	0.1-0.43	
	Total	100	100.00	100.00		
4.0	ASH FUSION RANGE					
	REDUCING ATMOSPHERE					
4.1	Initial Deformation Temp.(oC)	1200	1100	1150	1100	1200
4.2	Hemispherical Temp. (oC)	1400	1300	1350	1200	1400

4.3	Fusion Temperature (oC)	1400	1400	1350	1400	1450