Government eProcurement System

eProcurement System Government of India

Published Corrigendum Details

Date : 09-Sep-2025 06:04 PM

Print

Organisation Chain :	NHPC Limited||Corporate Office-Faridabad-NHPC||Contract-E and M-CO-NHPC
Tender ID :	2025_NHPC_861342_1
Tender Ref No :	NH/Conts(EnM)-III/Uri-I Stage-II/ENM/2025/01
Tender Title :	Lot-III Electro-mechanical works package of 240 MW (2X120MW) Uri-I Stage-II H.E Project
Corrigendum Type :	Technical Bid

Corrigendum Document Details

Corr.No.	Corrigendum Title	Corrigendum Description	Published Date	Document Name	Doc Size(in KB)
1	Corrigendum No. 05	Technical Amendments along with Informative Replies	09-Sep-2025 06:04 PM	CorrigendumNo05.pdf	6395.26

NHPC LIMITED
(A Govt. of India Navratna Enterprise)
NHPC Office Complex, Sector-33, Faridabad-121003, Haryana (India)
CIN: L40101HR1975GOI032564

Dated: 09.09.2025

Corrigendum No.5 along with Informative Replies-2

Name of Work: Lot-III: Electro-mechanical works package of 240 MW (2X120MW) Uri-I Stage-II H.E Project, Baramulla District of UT of J&K, India.

Ref: Tender Specification No. NH/ NH/ Conts(E&M)-III/ Uri-I Stage-II/ ENM/ 2025/ 01

[E-Tender ID: 2025_NHPC_861342_1]

In reference to subject tender, pursuant to queries from Prospective Bidders received after Pre-Bid meeting held on 20.06.2025, **Technical Amendments** are annexed as 'Technical_D_Amendment_02'.

All other terms & conditions and specifications of the Bid Document shall remain unchanged.

For & on behalf of NHPC Ltd.,

Sd/-

General Manager,
Contracts (E&M)-III,
2nd Floor, Jyoti Sadan, NHPC Office Complex,
Sector-33, Faridabad-121003 (Haryana),
Tele # 0129-2254687
E-mail: nalinikantverma@nhpc.nic.in

Name of Work: Lot-III: Electro-mechanical works package of 240 MW (2X120MW) Uri-I Stage-II H.E Project, Baramulla District of UT of J&K, India

Tender Specification No.:- NH/NH/Conts(E&M)-III/Uri-I Stage-II/ENM/2025/01

Tender ID.: 2025_ NHPC_861342_1

Technical_D_Amendment_02

Sl.No	Clause no	Authorised Amendments
1.GENERAL TECHNICAL SPECIFICATION		
1	Vol-III A (GTS), Cl no. 6.4.2	Following text is added : D. **3 phase TEFC Energy Efficient Induction Motors** 0.75 to 75 kW — Efficiency Class: IE4 Super Premium Efficiency class or better.
1. GENERAL TECHNICAL REQUIREMENTS		
1	Vol-IIIB (PTS), Cl no. 1.11.3	Complete clause 1.11.3 deleted**.**
2. TURBINE AND ACCESORIES		
1	Vol-IIIB (PTS), Cl no. 2.5.6.1	The text “15-20%” at para 2 of the clause is replaced with the text ”30%”. The text ”and runner……. 16 (sixteen)mm” stands deleted.
2	Vol-IIIB(PTS),Cl no. 2.5.5.1	The text “Two(2)” at para 2 of the clause is replaced with the text “One(1)”. Text “ Suitable arrangement shall be kept in Draft tube cone for installation of inspection platform, for safe and secure inspection /repair of components. (detail modalities shall be dealt during detail engineering).” is added at the end of para 2 of the clause.
3. DIGITAL GOVERNING SYSTEM AND ACCESSORIES		
1	Vol-IIIB(PTS),Cl no. 3.2.6	Complete Clause 3.2.6 deleted

5. GENERATOR		
1	Vol-IIIB (PTS), Cl no. 5.3.1, sr. no 10	The text “0.9” is replaced with text “0.85”.
6.STATIC EXCITATION SYSTEM		
1	Vol-IIIB(PTS),Cl no. 6.5.3	The text in the 5th para of the clause “ for the manual….respectively” is deleted
7.BUS DUCT		
1	Vol-IIIB (PTS), Cl no. 7.8, Mandatory spares, Sr. No-11	Quantity may be read as ‘1 set’.
10. XLPE CABLES		
1	Vol-IIIB (PTS), Cl no 10.1.1 Scope	New text is added as item xii : Scope of termination of one of the outgoing lines of URI I Stage II at GIS of Uri I Stage I and the other at pothead yard of Uri I Stage I includes: a) Dismantling of existing 400 kV XLPE cable termination at GIS of Uri I Stage I ,safe sealing arrangement of dismantled cable, supply of all necessary accessories and termination of the interconnecting 400 kV XLPE cable at same bay from where the existing cable is dismantled. The dia of existing cable is 1000 sqmm. b) Dismantling of existing 400 kV XLPE cable outdoor termination with HV bushing at pothead yard of Uri I Stage I, safe sealing of the dismantled cable, supply of necessary accessories, lattice structure, HV bushing and termination of the cable etc. from GIS of Uri I Stage II at the same location as that of the dismantled XLPE to air HV bushing termination. c) Dismantling of existing support structures of EHV cables from Cable tunnel and Rolling back the dismantled EHV cables of one circuit ,total 3 cables , each of approx. 830 m length, on existing drums in Potyard area.
11. GAS INSULATED SWITCHGEAR		
1	Vol-IIIB(PTS), Cl no.11.1.1.(4)	Note 2 is added: SF6 Gas work & other activities for dismantling of old XLPE cables and installation of new XLPE cables at 400 kV GIS of Uri Power Station shall be done by OEM i.e. M/s ABB and all coordination with OEM for this work shall be done by the employer. The contractor shall inform the employer well in advance about the timelines, when the services of OEM shall be required for completion of this work.
2	Vol-IIIB(PTS), Cl no.11.8 sub Cl 8	The text “2 nos. for each compartment” is replaced by text “10 nos. of each type”.
3	Vol-IIIB (PTS), Cl no 11.3-D-v),	The text “80% of rated normal current” is replaced by “as per IEC 62271-102”

13. DC SYSTEM		
1	Vol-IIIB(PTS), Cl no.13.3.1.1	The text “90%” is replaced with the text “ 85%” for last item of table for Battery Chargers.
14.CONTROL AND MONITORING(SCADA)SYSTEM		
1	Vol-IIIB(PTS), Cl no.14.1.5	Complete text at sub clause c) of the clause is replaced with the text “ Hardwares /accessories required for laying of ADSS cable, as required.” The text “Steel Poles …….the Employer” at the end of the clause stands replaced with the text “ Supply of Steel Poles (if any required) for laying of ADSS cable, its erection and laying of ADSS cable shall be in the scope of the Employer.”
2	Vol-IIIB (PTS), Cl no 14.1.1,	New sub-clause iv) is added as “ 01 no Automatic weather station as per “Annexure 2 to CMR” attached as “Attachment 1_Technical_D_Amendment_02” to this amendment.
3	Vol-IIIB (PTS), Cl no 14.5, para 1),	Text “& Power house and automatic weather station(to be located outside power house cavern either near MAT entrance or near DG area ,exact location to be decided during detailed engineering)” is added
16. CABLING SYSTEM		
1	Vol-IIIB(PTS), Cl no.16.5.2.3	The text “The cables interfacing with tripping coils and closing coils of 400 kV GIS breakers shall be fire survival type.” is added at the end of the clause.
19. LV SWITCHGEAR AND AUXILIARY TRANSFORMERS		
1	Vol-IIIB (PTS), Cl no 19.2.1 (para 8),	The text “GIS distribution Board” is replaced by “SSB1/SSB2”.
2	Vol-IIIB (PTS), Cl no 19.3.3 - H,	The text “800” is replaced by “1600”.
23. ELECTRICAL OVERHEAD TRAVELLING(EOT) CRANE		
1.	Vol-IIIB(PTS), Cl no.23.4	The text “The vertical …….span” at last para of the clause is replaced by the text “The vertical deflection of the crane girders caused by the rated load plus weight of the trolley should not exceed 1/1000 of the crane span. Text “The vertical deflection of a girder due to dead load such as its own weight plus the weight of parts permanently attached thereto, such as foot walk, drive mechanism, motor and control panels shall be fully compensated in the girder camber” is added at the end of the clause.
2.	Vol-IIIB(PTS), Cl no.23.5.4 last para	The text “safe working load and weight of crab” at last para of the clause is replaced with the text “rated load plus weight of the trolley”.

3	Vol-IIIB(PTS), Cl no.23.5.19.2	The text " of 60 minutes (40% CDF) rating " at 4th para of the clause is replaced with the text "40% CDF,150 starts per hour crane duty,"
25. DRAINAGE AND DEWATERING SYSTEM		
1	Vol-IIIB (PTS), Chapter 25	Complete chapter is revised and replaced as "Attachment 2_Technical_D_Amendment_02" to this amendment.
27. GROUNDING SYSTEM		
1	Vol-IIIB (PTS), Cl no 27.2.1	2nd last para i.e. ""The concreting……. by the E&M Contractor" stands replaced by following text : " The excavation, backfilling for laying of the conductors and electrodes for the mat and concreting of the embedded grounding system shall be done by the civil Contractor under the supervision of the E&M Contractor. If "Bentonite Clay" or "Ground Enhancing compound" is required to be used in the design to obtain the desired resistance, the same shall be provided by the E&M Contractor. It will be responsibility of the E&M contractor that the requisite ratio of ground enhancing compound is being achieved while backfilling by civil contractor."
29. FIRE FIGHTING SYSTEM		
1	Vol-IIIB (PTS), Chapter 29	Complete chapter is revised and replaced as "Attachment 3_Technical_D_Amendment_02" to this amendment.
B	**ATTACHMENT 5**	
1	Attachment 5 A , item 18.1 11 kV VACUUM CIRCUIT BREAKER	The text "BHEL" is added in the list of vendors
2	Attachment 5 B	Attachment 5 B is revised and updated and placed as "Attachment 4_Technical_D_Amendment_02" to this amendment.
C	**Vol-III C (TECHNICAL DATA SHEETS)**	
1	Vol-IIIC (TDS), Chapter 25, 29,30,31,32,33	Revised TDS of the chapters 25,29,30,31,32,33 are placed as "Attachment 5_Technical_D_Amendment_02" to this amendment.

2	Vol-IIIC (TDS),Chapter 5	The text “0.9” at item/clause 15 is replaced with the text”0.85”.
3	**Cl 8.1.30**	Text “YES” may be read as “As per QAP”.
D	**Vol-IV (Drawings)**	
1	Vol-IV /Firefighting system	Dwg NH/DEM/URI I STG-II/FF/01 is revised and replaced as “Attachment 6_Technical_D_Amendment_02” to this amendment.
2	Vol-IV COMPUTERIZED CONTROL AND MONITORING SYSTEM	Dwg NH/DEM/URI-ISTG-II/CP/02 is revised. Revised drawings is attached as “Attachment 6_Technical_D_Amendment_02” to this amendment.

Annexure 2

1.0 Technical Specifications of Weather Monitoring station

1.1 Technical Specification of Sensor

A)	**Ultrasonic Wind Sensors**	
i)	**Wind Direction**: The sensor to provide low starting threshold, fast response and accuracy over a wide operating range in adverse environmental conditions.	
	Particulars	**Specification**
a.	Measurement Range	0 to 359.9°
b.	Accuracy	±3% or better
c.	Starting threshold	0.5 m/s
d.	Resolution	1°
ii)	**Wind Speed:** The sensor to provide a low starting threshold, wide dynamic response and high accuracy over a wide range of wing speeds and a variety of environmental conditions.	
	Particulars	**Specification**
a.	Measurement Range	0-75 m/s or better
b.	Resolution	0.01 m/s or better.
c.	Threshold	0.01 m/s
d.	Accuracy	± 2% or better
iii)	**Output**	**Digital/Analog**
iv)	**Protection level Housing**	**IP65 or above.**
B)	**Temperature & Humidity Sensor with Radiation Shield**	
i)	**Temperature**	
	Particulars	**Specification**
a.	Temperature range	-10° to 60° C
b.	Resolution	± 0.1° C
c.	Accuracy	± 0.35 °C or better
ii)	**Relative Humidity**	
	Particulars	**Specification**
a.	Measuring range	0 to 100% RH
b.	Accuracy	± 3% or better
c.	Resolution	0.1%
iii)	**Output**	**Digital/Analog**
iv)	**Radiation Shield**	
	Particulars	**Specification**
a.	Type	Thermoplastic
b.	Louvered	Minimum 9
C.	Ventilation	Natural

C) Rainfall		
	Particulars	**Specification**
a.	Sensor type	Siphon control mechanism with dual switch with varistor protection and Tipping Bucket
b.	Orifice Size/ collector diameter	The specified diameter of the collector rim should be 200 mm
c.	Collector Area	The specified Collector Area should be 314 cm^2
d.	Switch	Rugged Magnetic Proximity
e.	Resolution	0.5 mm per tip or better
f.	Rainfall capacity	Unlimited
g.	Accuracy	±2% or better, for rain rate up to 25 mm/hr ±3% or better, for rain rate between 25mm/hr to 50 mm/hr ±4% or better, for rain rate between 50mm/hr to 100 mm/hr ±5% or better, for rain rate>100 mm/hr
h.	Material of Outer Body/housing (Base/Collector)	Any one of the following: 1. Marine grade stainless steel 2. Fibre glass Reinforced Plastic (FRP) 3. UV resistant ABS plastic 4. Anodized Aluminum alloy (Al 99.5 grade)
i.	Levelling	Suitable levelling adjustment screws and circular spirit level must be provided on the base of TBRG for levelling the Tipping bucket Mechanism.
j.	Debris protection filter	Suitable (Wire mesh) debris protection filter should be provided inside the collector.
k.	Output	Digital/Analog

1.2 Data Acquisition System

a) The data acquisition-logger system should acquire all the inputs from sensors mentioned at Clause 1.1 above.

b) The data acquisition system should have keypad (non-touch screen and a backlit LCD/LED display) with menu driven facility for local display and setting.
c) The data acquisition system should have suitable ports & media converters to interface to plant SCADA using optical fibre cable.
d) The data acquisition system shall have a provision for a 24-hour Real Time Clock (RTC) powered by a battery (with minimum one-year lifetime) to ensure that time is maintained even during power outages.
e) The Data acquisition system shall have functionality of time synchronisation from plant SCADA.
f) Data acquisition system shall have provision to integrate with plant level SCADA system on MODBUS/IEC-104/IEC 61850 through TCP/IP communications. Redundant ports for IEC-104/MODBUS/IEC 61850 communication shall be available in the system. Also, the following must be ensured:

i) Cyber security guidelines of MoP is fully complied while interconnecting the data acquisition system to plant SCADA.
The deployment of suitable perimeter level cyber security devices, including firewall, at point of interconnection of DAS with SCADA systems such that the deployed security system meets the requirements of, inter alia, detection and filtering of OT related protocols as well as traffic; content, user and application based filtering; deep packet inspection, intrusion detection; geo-fencing; user controlled updates; detection based on signature and behavioural anomalies and filtering thereof.
ii) The continuous monitoring of such interconnection for detection of malicious activities and corrective measures thereof.
iii) The logs associated with such interconnection shall be retained for a period of 180 days by the data logger.

1.2.1 Data Sampling

i) The sampling and measurement interval for individual parameters shall also be user selectable.

1.2.2 Data Quality Control

(i) The DAS should have a facility to apply Quality Control procedures such as Gross error checks and time consistency checks for sensors interfaced.

(ii) Plausible value check (The gross error check on measured value): Each sample should be examined to check if its value lies within the measurement range of a particular station. If the value fails the check, it is rejected and not used in the further computation of the relevant parameter.

1.3 Power Supply

The complete AWS station shall have the capability for unattended operation at remote places using Maintenance Free (MF) Battery, and rechargeable through a Solar panel .

(i) Battery: Suitable capacity MF (Maintenance Free Battery).
(ii) Solar Panel: Suitable solar panel to charge the SMF battery.
(iii) Provision to charge the battery through 230 V AC Supply.

1.4 Weatherproof FRP Enclosure

(i) Weatherproof Enclosure of AWS should be FRP Enclosure (IP 66) and for outdoor use to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, and hose-directed water.
(ii) One FRP Enclosure (IP 66) shall be suitable to keep Data logger and switch with the suitable fuse for power supply to the Data logger. Another separate FRP Enclosure (IP 66) for MF batteries should also be provided.
(iii) Silicone gasket is used for both Enclosures in harsh environments and extreme temperatures.
(iv) Enclosure shall be with hinged door and locking facility.

25 DRAINAGE AND DEWATERING SYSTEM

25.1 Scope of Work

Scope of work under this section covers the provision of labour, tools, plants, materials and performance of work necessary for the design, manufacture, quality assurance, quality control, shop assembly, shop testing, delivery at site, site storage and preservation, installation, commissioning, performance testing, acceptance testing, training of Employer's personnel, handing over to Employer and guarantee for two years of drainage and dewatering system, as per the specifications hereunder, complete with all auxiliaries, accessories, spare parts and warranting a trouble free safe operation of the installation.

The scope of work shall be a comprehensive functional system covering all supply and services including but not be limited to following:

25.1.1 Submersible pumps and associated accessories

i) Four (4) Submersible slurry pumps with starter panel, submersible cables and associated accessories for automatic operation of power house drainage system,

ii) Two (2) Submersible slurry pumps with starter panel, submersible cables and associated accessories for flood dewatering in emergent condition,

iii) Four (4) Submersible slurry pumps with starter panel, submersible cables and associated accessories for automatic operation of dewatering of turbines,

iv) Two (2) Submersible pumps with starter panel, submersible cables and associated accessories for drainage of Oil/ Water Sump in transformer cavern,

v) Two (2) Submersible pumps with starter panel, submersible cables and associated accessories for automatic operation of Transformer cum GIS cavern drainage sump,

vi) Two (2) Submersible pumps with starter panel, submersible cables and associated accessories for automatic operation for drainage of MAT cum Access Tunnel to transformer drainage sump,

vii) Two (2) Submersible pumps with starter panel, submersible cables and associated accessories for automatic operation for drainage of MAT drainage sump,

viii) Two (2) Submersible pumps with starter panel, submersible cables and associated accessories for automatic operation for drainage of MAT and Adit to Powerhouse crown drainage sump,

ix) Two (2) Submersible pumps with starter panel, submersible cables and associated accessories for automatic operation for drainage of Control block cavern drainage sump,

x) Two (2) Submersible pumps with starter panel, submersible cables and associated accessories for automatic operation for drainage of Adit to Lower penstock erection Gallery sump,

xi) Necessary isolation valves, motorized operated draft tube drain valves, piping, regulating orifice, air scouring arrangement, floor/ sump covering, pressurised covering on dewatering sump, all type of consumables and other materials,

xii) Necessary pressure gauges, level transmitter, level switches etc,

xiii) Digital type electromagnetic flow meter in common headers and suitable type flow switch for each pump.

xiv) One (1) set of electric monorail hoist arrangement of 2T capacity along with associated accessories for handling of powerhouse drainage and dewatering pumps, as per approved drawing during detailed engineering

xv) Coordination and provision of necessary contacts, and/or ports for integration with plant SCADA system,

xvi) Spare parts in accordance to clause 25.8 “Spare Parts” of this section.

xvii) Tools and instruments in accordance to clause 25.9 “Tools and Instruments” of this section

Any other item(s) not mentioned specifically but necessary for the satisfactory completion of scope of work defined above, as per accepted standard(s) / best international practices.

25.2 Specific Parameters and Layout Conditions

Normal unit dewatering operation shall be by submersible pumps installed in the dewatering sump.

Suitable provision for stage dewatering of the unit shall also be made. The stage dewatering shall be done by a suitable size of pipe with valve connected at the bottom of draft tube cone, which shall drain water into the dewatering sump through dewatering header/separate header.

Drainage and dewatering sump shall be interconnected through suitable size pipe (approx. DN 400) with necessary heavy duty gate valves suitably supported having extended stem and non-return valve to allow only drainage water pass onto the dewatering sump.

The drainage sump shall be provided with heavy duty chequered plate cover. The dewatering sump shall have pressurised/ sealed cover to withstand maximum downstream water pressure. All the opening and cut-outs provided for cables, pipes etc. in the dewatering sump cover shall be properly sealed.

25.2.1 Layout and General arrangement

25.2.1.1 Drainage gallery and sump

The powerhouse drainage system shall consist of a drainage sump and a drainage gallery spanning the length of the powerhouse for collection of seepage and leakage from all the units. The powerhouse drainage gallery shall terminate in the drainage sump. The water from this sump shall be pumped out by two pumps into the river outside MAT portal (at approx. EL 1288 M). Pipe shall be suitably bent at the outside MAT portal for discharging water.

Suitable float switches for auto starting and stopping of pumps shall be provided. The capacity and quantity of pumps should be such that 100% capacity shall be considered as spare.

25.2.1.2 Transformer oil water sump

One large sump shall be provided in the transformer cavern floor to store single transformer oil charge plus forty (40) minutes of deluge flow on single transformer. This shall allow retention of any oil released during a fire for subsequent removal, for which suitable arrangement shall be provided by the Contractor. The transformer oil water sump shall have proper oil retrieval arrangement and shall have submersible pumps installed in the sumps for drainage through necessary piping and valve system. The water from oil water sump shall be channelized to Transformer cavern drainage sump through gravity drain system.

The transformer oil sump shall incorporate a curbed collection chamber sized to contain a quantity in excess of the oil volume in a transformer. Fire deluge water shall collect in a trench at the bottom of the chamber after passing through a crushed stone quenching bed. From the trench, deluge flows shall be led through water trapped elbows into transformer oil water sump.

25.2.1.3 Elevator Sump

Elevator sump shall have minimum two gravity drain pipes emptying into the powerhouse drainage sump. In case gravity drains are not feasible, proper pumping arrangement with auto operation and discharge piping to drainage gallery/ sump shall be provided.

25.2.1.4 Maximum water level for design basis accident situation

During design basis accident situation as mentioned hereafter, the flood water shall accumulate in the MIV floor in accident situation. However, under no circumstances, the water level shall be allowed to go above EL 1235.0 M, which is designed as ‘Maximum water level for design basis accident situation.

25.2.1.5 Flood Dewatering Sump/ Pump

Two pumps for flood dewatering in emergent condition should be provided in drainage sump at the Runner Removal floor in the powerhouse cavern. The water accumulated in the sump/floor will be pumped out of the power house to DT gate downstream. The capacity of the pump shall be same

as that of dewatering pump. Power house complex drainage and dewatering system.

The power house drainage system shall take care of any sudden increase in powerhouse leakage to avoid any potentially disastrous effect. The drainage system shall maintain the electromechanical installations above water in design basis accident situation. All the seepage and leakage water (including water resulting from firefighting operation in generator) from different floor of the powerhouse shall be channelized into drainage sump via drainage gallery.

Seepage water from the two bus duct galleries, penstock bottom adit/adit to crown near control room and equipment gallery shall also be channelized into the Power house drainage sump. The seepage water from inspection gallery and Adit to lower penstock erection gallery shall be channelized through gravity to the Power house drainage sump. Discharge resulting from firefighting operation in transformer cavern shall accumulate in the 'Oil water sump' located in the transformer cavern at approx. EL. 1239.80 M and water shall be channelized/pumped to Power house drainage sump.

The seepage/leakages of the caverns/ areas not specified explicitly should be channelized into any of the two sumps viz. Power house sump, and Transformer cum GIS cavern oil water sump or suitably pumped outside with 100% redundancy.

The Control panel for powerhouse drainage, dewatering and flood dewatering system shall be placed at elevation above turbine floor preferably at service bay level.

The drainage sumps shall have continuous duty submersible pumps with float switches for auto starting and stopping of pumps. All submersible pumps installed in a sump for drainage purpose shall discharge water outside the power house to river through MAT.

A common dewatering wet sump for all the units shall be provided. The dewatering sump shall be located at location as shown in the drawing no. NH/DEM/URI I ST II/D&D/01. Unit dewatering from all the units shall be channelized into dewatering sump via a common pipe header of at least DN 450 as shown in the drawing no. NH/DEM/URI I ST II/D&D/01. Two (2) draft tube drain valve (at least DN 300) with extended stem (to be operable from the Runner Removal floor) for dewatering of each unit shall be provided. The drain valve should be operable hydraulically preferably through Motorized valve and manually also. One (1) manual operated heavy duty gate valve and flow control/ restricted device shall be provided in common dewatering header to dewatering sump. Possibility of removal of DT drain/dewatering valve from runner removal floor may be explored.

All the dewatering submersible pumps shall feed water into a common discharge header and shall finally deliver through a outlet line with outside flap valve to TRT (at approx. EL 1267M) via DT gate hall.

The size of the outlet pipes for powerhouse drainage and dewatering system shall be sufficient to accommodate one additional pump of same capacity and shall have tapping for connection of one additional pump in future. One spare drainage pipe of DN 400 with

valves and blank flanges shall be laid in MAT for discharge of water from drainage and dewatering sump top to outside the powerhouse.

Two (2) nos. Submersible pumps of tentatively same discharge and head as that of Power house dewatering pumps shall be installed at EL 1210 M (tentatively) with delivery of water outside the power house to the river via MAT through a common drainage header with necessary NRV and isolating valves for use under emergent condition such as power house flooding. The starting and control panel shall be installed at even higher level. The power and control cables for these pumps shall be without any joints. Layout/ functionality/ detailing shall be finalised during detailed engineering.

Two (2) nos. submersible slurry pumps shall be installed at the bottom of the sumps with delivery outside the power house to river via the common drainage header with necessary NRV and isolating valves to cater to the silt, solid particles etc. accumulated in the sump bottom. Layout/ functionality/ detailing shall be finalised during detailed engineering

25.2.1.6 Civil areas/ works

In addition to main powerhouse drainage & dewatering system, provision shall also be made to cover the following areas with suitable drainage pump capacity

- Main Access tunnel (MAT)
- MAT and Adit to Powerhouse cavern crown
- Transformer cum GIS cavern drainage sump
- Transformer cavern oil-water sump.
- Adit cum Cable Gallery
- Cable cum Escape Tunnel (02 Nos)
- Adit to lower Penstock Erection gallery

The location of various sumps for the above areas has been decided during detail engineering. Each sump shall be provided with continuous duty submersible pumps with automatic control for auto starting and stopping of the pumps. The water from the above sumps shall be pumped outside the Power house suitably.

i) All drainage and dewatering piping including embedded piping shall be provided with adequate air scouring arrangement and shall be properly supported. Wherever possible, embedded pipes and exposed pipes are to be connected through bolted flange instead of welding.

ii) The locations of various sumps & their pumping destination as exhibited above are tentative and the same shall be decided during detailed engineering.

25.2.1.7 Dewatering of turbine

Dewatering of penstock/ pressure shaft shall be normally be done by gravity up to tail race level through draft tube. Remaining water between penstock and draft tube shall be channelized into the

dewatering sump which shall be discharged to river (at approx. EL1267M) via DT gate hall. Provision for stage dewatering of each unit shall be made. Pipe with necessary valve at minimum possible elevation shall be provided in the draft tube elbow. The drain water shall be channelized through pipeline to the dewatering sump.

Suitable diameter pipe and valve with extended stem shall be provided for stage dewatering of the unit.

25.2.2 Design considerations

The project is situated in Himalayan region where the silt content during high flow period is excessive and peaks abnormally. Even though material specifications have been included and it is not the intention to ask guarantee yet it is mentioned that the submersible pumps are expected to operate under silt concentration (detailed vas per Enclosure-1) during high flood. Reliability of the pumps in high silt laden water is of critical importance as bottom of sump pits shall have substantial silt deposition. The petrographic analysis of silt in water and chemical analysis of water is detailed in clause 1.5.1.2 c) & d) of “Section-1, General Technical Requirements”.

The Contractor shall critically study the silt data and chemical analysis of water and take the same into account in designing the Drainage & Dewatering system susceptible to abrasive effect of silt, making all such specific provisions and measures including selection of materials, surface coating, corrosion protection/ painting which will help to resist silt erosion/abrasion and enable easy and quick maintenance/replacement of worn out components.

25.3 Rating and Functional Characteristics

25.3.1 Drainage and Dewatering system

The total pumping capacity and drainage sump of the drainage system must be designed to handle the seepage, leakage for all the units and the largest fire protection deluge flow in the powerhouse.

The total pumping capacity and sump size of the dewatering system must be designed to handle the design flows during dewatering operation of individual units and shall have at least two standby pumps. The design flow rate during dewatering operation shall be calculated to empty remaining water between penstock and draft tube gate in approximately 4 to 6 hours after gravity drainage.

The pumps shall be submersible type having discharging capacities as per the details given below. The design capacity of all the pumps shall have a minimum safety margin of 10 % over and above the duty point i.e. desired flow and corresponding head. The velocity in the pipe shall normally not to exceed 4.0 m/s. The ratings mentioned below are tentative and only for information to the Contractor. The Contractor shall do necessary calculation proving the adequacy of the selected pump – motor rating. In any case, minimum pump discharge shall be as per below. The pumps shall be suitable for continuous operation, capable of pumping water with heavy silt, directly driven by electric motor rotational speed of which shall preferably be not more than 1450/1500 rpm subject to

hydraulic flow conditions and operating zones of the pumps, higher speed shall be acceptable under technical/ manufacturing compulsions only.

S. no.	Description	Nos. Of Pumps	Rating of each pump	
			LPM (min.)	Indicative Discharge head (M)
1.	Submersible slurry pump for power house drainage	4	6000	To be decided during detailed engineering
2.	Submersible slurry pump for flood dewatering	2	6000	
3.	Submersible slurry pump for power house dewatering	4	6000	
4.	Submersible pump for oil water sump	2	3000	
5.	Submersible pump for Transformer cum GIS cavern drainage	2	4000	
6.	Submersible pump for MAT cum AT to Transformer Drainage	2	4000	
7.	Submersible pump for MAT	2	6000	
8.	Submersible pump for MAT and Adit to PH crown	2	3000	
9.	Submersible pump for Control Block Drainage	2	3000	
10.	Submersible pump for Adit to Lower penstock Erection Gallery	2	3000	

The drainage and dewatering system shall entirely operate by its own automatic control equipment. All control equipment of the drainage and dewatering system shall be located above the maximum water level.

25.4 Performance Guarantee

The drainage and dewatering system along with all auxiliaries and accessories shall be capable of performing intended duties under specified conditions. The Contractor shall guarantee the reliability and performance of the individual equipment as well as of the complete system.

25.5 Design and Construction

25.5.1 Standards

The system and equipment shall be designed, built, tested and installed to the latest revisions of the following applicable standard. In the event of other standards being applicable they will be compared for specific requirement and specifically approved during detailed engineering for the purpose:

Sl. No.	Standard	Description
1.	IS 4721	Code of Practice for Drainage and Dewatering of Surface/Underground Hydroelectric Power Station

25.5.2 Pumps

The drainage, dewatering and flood dewatering pumps shall be of vertical, double sealed, submersible slurry type with motors of continuous duty capable of pumping raw, unscreened, heavily silt laden water. The submersible pumps shall be of a proven design suitable for solids handling. All pumps of similar capacity shall be interchangeable.

Other area sump pump shall be non slurry submersible pumps.

The material of the pump impeller and casing shall preferably be stainless steel (AISI 316 or better) and cast steel(ASTM A 216WCB) /grey cast iron respectively. The pump impeller shall have high efficiency multi thick vane preferably closed type with excellent abrasion and corrosion resistant properties. The wall thickness of pump casing shall be suitable for heavy duty operation. The material for shaft, hardware and fasteners shall be stainless steel (AISI 410 or better). The pump impeller shall be properly balanced along with other rotating parts on proper balancing equipment to prevent vibration. The casing of the pump shall be of ductile iron or improved cast iron.

Two numbers heavy duty mechanical seals for submersible pumps shall be provided. The material of primary and secondary seal shall be heavy duty Silicon Carbide (SiC) or Tungsten cemented Carbide (WCCR). In addition to the dynamic designed capabilities of the pumps, pump-motor including mechanical seals, motor sealing, cable glands, flange joints etc. shall also be designed to sustain maximum water submergence pressure for giving trouble free performance (to be finalized during detailed engineering). The pump-motor bearings shall have minimum life expectancy of 70,000 hours.

The heavy duty submersible slurry pumps shall be designed and constructed to pump water containing up to 70% (concentration by weight) abrasive solids, silt, fibrous material etc without causing excessive wear or early pump failure. The submersible pumps shall be designed and fitted with all necessary components required for operation with intended use. The submersible slurry pumps shall be designed to have similar or better material specifications than other drainage pumps as per operating conditions/ requirements with approval of the employer during detailed engineering.

Pumps shall be provided complete with continuous duty electric motors with class H/F insulation (temperature rise limited to class B), starter for auto operation, FRLSH power cable (joint less cable from pump to starter panel), discharge piping and hardware, anchor bolts and other mounting materials. The pumps shall be suitable for 415 V ± 10%, 50 Hz ± 5% with contacts for remote operation / indication.

Pump motors shall be suitable for minimum 15 starts per hour and shall have minimum service factor of 1.1.

Flow switches with suitable nos. of contacts for remote indication and alarm shall be provided for each pump. Gate Valves and check valves shall be provided for each pump to allow disconnection and switching of each pump without emptying pipes. All common delivery pipes shall necessarily be provided with one gate valve and check valve at outlet side so as to enable to close the same under emergency when tail water level is very high. Each pump shall be provided with pressure gauge, flow switches with isolation valve in the discharge side. Power house drainage sump shall also be provided with ultrasonic/radar level transmitter for remote continuous sump water level indication.

Submersible pumps shall be installed in wet sump/pit on a guide rail to allow for removal and installation of pumps without entering the wet well. The pumps shall be provided with auto-setter coupling, discharge base lifting lug, guide support, guide rail and chain. The material for guide support, guide rail, bolts, hardware and chain shall be stainless steel.

Glycol based coolant or better cooling jacket for motor cooling shall be provided (to maintain the minimum submergence level after dead volume). Motor cooling arrangement should confirm to IS 6362.

25.5.3 Valves, Piping and Floor drains

All required pipes, valves, NRV, isolating valves flanges, fittings, supports, fasteners, and related material shall be supplied as part of this contract. All embedded and exposed piping shall be of seamless of minimum schedule 80. All gravity drain pipes shall be seamless schedule 40. All flanges shall be of grooved type with O-ring arrangement. The piping and valves material shall be in accordance with clause 5.7 ”Piping, Fittings, Valves, and Heat Exchangers” of General Technical Specification (GTS).

The contractor shall do necessary coordination and shall make detailed layout drawings for routing of the pipes etc. and submit the same for approval of the Employer during detailed engineering. Silent type check valves shall be used in pump discharge lines.

Check valves of size 150 mm and above shall be of dashpot assisted check valves and size below 150 mm, dual plate check valve (Silent type) shall be used.

All flanges shall be of grooved type with O-ring arrangement. Automatic air purging valves at suitable location shall be provided for all headers at suitable locations.

All required pipes, valves, flanges, fittings, supports, fasteners, and related material shall be supplied as part of this contract.

Valve body of all type of valves shall be preferably of cast steel except smaller valves (50 mm and lower) for which material shall be stainless steel.

25.5.4 Insulation for piping

In case of anticipated condensation of any part of the exposed pipes, the same shall be insulated against condensation with approved type insulation/lagging with vapour proof cover, if required.

25.5.5 Control and monitoring

The drainage and dewatering system control and monitoring system shall be as per the following clause. Also, control and monitoring system requirement as defined in “Section 14 - Control and Monitoring System” and “Section 15 - Protection System” need to be fulfilled.

25.5.5.1 Control

The pumps shall be controlled and monitored at three levels:

1) Respective local control cubicles,
2) Local Control Board for common services
3) Computerized control and monitoring (SCADA) system through Local Control Board for common services.

Facility for selection of control either from Local Control Cubicle or Local Control Board or plant SCADA system shall be provided in the Local Equipment Panel or Local Control Board.

The Contractor shall make provision of contacts and/or ports in local control cubicles for interfacing with SCADA system for control and monitoring.

The Contractor shall provide and install all the sensors and operating devices necessary to fulfil the functional requirement of the specification for control system.

All pumps shall be automatically controlled based on the sump level sensed by adequate instrumentation. However, control philosophy shall also have following control provisions:

I. Automatic start and stop of pumps on the basis of low and high water level in the sump,
II. Running time control with change of sequence to equalise running time,
III. Automatic starts of next lower running time pump in case of hydraulic or electrical fault in pump,

Following local controls, but not limited to, shall be provided for each drainage and dewatering pump:

a) Manual/Automatic switch for manual/automatic operation of each pump,
b) Remote/ local selector switch for each pump,
c) Start/stop push buttons for each pump,

d) Lamp test push buttons,

25.5.5.2 Indication and Alarms

The Contractor shall supply suitable instruments and gauges for achieving desired control logic. Indicating instruments as required shall be installed on local control panel and indications may be replicated in Local Control Board/ control room for common services.

Following indications and alarms, but not limited to, shall be provided for each drainage and dewatering water pump:

I. Pump running/stop/trip for each pump,

II. “No flow” for each pump,

III. Very high and very low water level (sump) alarms,

IV. Running hours of each pumps,

V. Other indications, if any.

25.5.5.3 Protection

The motor for each pumping unit shall be provided with at least the following device:

a. Over load protection,

b. Under voltage protection,

c. Single phasing protection,

d. Moisture sensor for moisture ingress in winding

e. High bearing temperature protection

25.6 Drawings, Documents and Design Calculations

25.6.1 Design memorandum

The Contractor shall submit to Employer a design memorandum prepared in accordance to clause 1.6 “Record and Documentation” of “Section 1- General Technical Requirements.”

25.6.2 Drawings and documents

The Contractor shall submit all the drawings and documents in accordance with requirements stipulated in “Section 2 - Technical Documents” of “General Technical Specification (GTS)”.

25.6.3 Design calculation

The Contractor shall submit the design calculation in accordance to Clause 2.4 of “General Technical Specification (GTS)” covering at least the following, for review / acceptance.

a. Calculation for selection of pump head, pump flow and pump motor rating for drainage and dewatering system

b. Any other calculation required during detailed engineering,

25.7 Delivery, Installation and Commissioning

The Contractor shall follow the requirements of Delivery, Installation and commissioning elaborated in clause 1.7 “Delivery, Installation and commissioning” of “Section 1 - General Technical Requirements.”

25.8 Spare Parts

Recommended spare parts shall be supplied in accordance to clause 1.8 “Spare Parts” of “Section 1 - General Technical Requirements”. Specified spare parts to be supplied under this section are as follows:

S. No.	Description	Quantity
1.	Submersible slurry pumps for power house drainage system	
a)	Complete submersible pump–motor set	2 Nos.
b)	Bearing	4 set
c)	Mechanical seal	4 set
d)	Complete seal kit	4 set
2.	Submersible slurry pumps for Power house flood dewatering system	
a)	Complete submersible pump–motor set	1 no.
b)	Bearing	2 set
c)	Mechanical seal	2 set
d)	Complete seal kit	2 set
3.	Submersible slurry pumps for Power house dewatering system	
a)	Complete submersible pump–motor set	2 nos.
b)	Bearing	4 set
c)	Mechanical seal	4 set
d)	Complete seal kit	4 set
4.	Submersible pump for oil water sump	
a)	Complete submersible pump–motor set	1 no.
b)	Bearing	2 set
c)	Mechanical seal	2 set
d)	Complete seal kit	2 set

S. No.	Description	Quantity
5.	Submersible pump for Transformer Cum GIS Cavern	
a)	Complete submersible pump–motor set	1 no.
b)	Bearing	2 set
c)	Mechanical seal	2 set
d)	Complete seal kit	2 set
6.	Submersible Drainage pumps for MAT cum Access Tunnel to Transformer Cavern	
a)	Complete submersible pump–motor set	1 no.
b)	Bearing	2 set
c)	Mechanical seal	2 set
d)	Complete seal kit	2 set
7.	Submersible pumps for Main Access tunnel (MAT)	
a)	Complete submersible pump–motor set	1 no.
b)	Bearing	2 set
c)	Mechanical seal	2 set
d)	Complete seal kit	2 set
8.	Submersible Drainage pumps for MAT and Adit to PH crown	
a)	Complete submersible pump–motor set	1 no.
b)	Bearing	2 set
c)	Mechanical seal	2 set
d)	Complete seal kit	2 set
9.	Submersible Drainage pumps for control block cavern	
a)	Complete submersible pump–motor set	1 no.
b)	Bearing	2 set
c)	Mechanical seal	2 set

S. No.	Description	Quantity
d)	Complete seal kit	2 set
10.	Submersible Drainage pumps for Adit to Lower Penstock Erection Gallery	
a)	Complete submersible pump–motor set	1 no.
b)	Bearing	2 set
c)	Mechanical seal	2 set
d)	Complete seal kit	2 set
11.	Flow switch and Flow meter	2 nos. of each type
12.	Valves of each type 80mm and above	2 nos. of each type
13.	Pressure gauges and Pressure Switch	4 nos. of each type
14.	Level switches	5 nos. of each type.
15.	Level transducer/transmitter of each type	2 nos. of each type

25.9 Tools and Instruments

The Contractor shall supply all necessary tools and instruments etc. for installation, repair and maintenance in accordance to clause 1.9 “Tools and Instruments” of “Section 1 - General Technical Requirements”.

25.9.1 Special tools

The Contractor shall list and supply all special tools. List of such tools including their make and detailed specification, shall be submitted for acceptance by the Employer.

25.10 Quality Assurance and Testing

The Contractor shall follow the quality assurance and testing requirements specified separately in “Quality assurance and Testing Specifications (QTS)”.

29. FIRE FIGHTING SYSTEM

29.1 Scope of Work

Scope of work under this section covers the provision of labour, tools, plants, materials and performance of work necessary for the design, manufacture, quality assurance, quality control, shop assembly, shop testing, delivery at site, site storage and preservation, installation, commissioning, performance testing, acceptance testing, training of Employer's personnel, handing over to Employer and guarantee for two years of fire fighting system, as per the specifications hereunder, complete with all auxiliaries, accessories, spare parts and warranting a trouble free safe operation of the installation.

The scope of work shall be a comprehensive functional system covering all supply and services including but not be limited to following:

29.1.1 Fire protection system

i) Two (2) nos. horizontal centrifugal pumps of suitable type, along with local control panel, instrumentation and associated accessories for filling of overhead water tank from tail race,

ii) Four (4) nos. automatic self-cleaning simplex strainer complete with automatic purging system, instrumentation, controls and other accessories for firewater circuit,

iii) Two (2) nos. Y type strainer complete with automatic purging system, instrumentation, controls and other accessories for firewater circuit,

iv) Two (2) nos. Bore well pump of suitable type, along with local control panel, instrumentation and associated accessories,

v) Two (2) nos. booster pumps(one electric driven &other diesel driven) each having 100 % capacity required along with local control panel, instrumentation and associated accessories, if pressure is below the desired pressure required for DG room area and Transformer cum GIS Cavern due to location of Fire water tank.

vi) Seven (7) nos. deluge system for fire protection of each GSU transformer (including spare GSU transformer)

vii) Four (4) nos. deluge system for fire protection of each Bus Reactor (including spare reactor)

viii) Two (2) nos. of deluge system for fire protection of governor oil pumping units,

ix) Two (2) nos. of deluge system for fire protection of main inlet valve oil pumping units

x) Suitable no. of Deluge system for firefighting of XLPE Cable, power & control cables/trays/GIB in the cable tunnel ,bulk oil

storage tank ,DG room and trenches/gallery as per approved drawings and bill of materials

xi) Wet sprinkler system for offices, conferences room/ meeting rooms/ stores, cable spreading room area, cable trays in power house, DG area, Pothead yard etc. as per approved drawings

xii) Fire fighting hose cabinets along with hydrant valve and hose reels as per approved drawings

xiii) Portable fire extinguishers as per approved drawings including E&M stores,

xiv) Insulation for fire fighting pipes, wherever required.

xv) Fire balls along with accessories for all electrical panels, unprotected cables / trays, floor / wall crossing cables etc. covering entire area. The quantity, type / capacity of the fire ball shall be decided during detail engineering.

xvi) Clean agent automatic direct low pressure fire suppression system employing heat sensitive polymer detection tube for electrical panels etc. as detailed in the subsequent clause of this specification.

xvii) Suitable capacity of booster pumps (DG, Electric) if required to maintain the pressure of main fire header to powerhouse & transformer as per standard shall be in the scope of contractor.

xviii) All piping including embedded and exposed piping, pressure reducer station, valves, fittings, instrumentation and associated accessories necessary for the system including separate filling pipe from filling pumps to fire tank and pipe from fire tank to main fire header.

29.1.2 Fire detection system

i) Intelligent, analogue, addressable type sensors/ detectors such as multi-sensors (smoke and heat), photo-electric detectors, optical beam detectors and thermal sensors/ detectors complete with necessary cabling distributed throughout the plant for detection of fire,

ii) Digital linear heat sensing cable (LHS) / optical fibre based digital linear heat sensing cable along with associated accessories for detection of fire in the cable/ cable trays throughout the plant as per approved drawings,

iii) Aspirator type smoke detection system complete with ancillary devices and remote display for generator, excitation cubicle, main control room, office and conference room.

iv) Manual pull stations and notification devices such as fire horns/ alarms/ hooters/ bells, light or text display etc. distributed strategically throughout the plant for manual intervention and audible and visual alarm as per approved drawings,

29.1.3 Alarm panels and misc. items for the fire fighting system including:

i) Local alarm panels as required distributed throughout the plant,

i) One (1) microprocessor based addressable analogue, intelligent type main fire alarm panel with minimum five loop panel located in control room along with licensed firmware and key from OEM,

ii) Four (4) repeater panels, one located at main access tunnel entrance, second in the service bay , third in Control Block, Fourth in Transformer Cum GIS Cavern.

iii) One (1) fire workstation with latest configuration (with minimum 1TB SDD and 16 GB RAM) and 32" LED monitor along with licensed firmware & operating software and key (lifetime validity).

iv) Two (2) video display units with smart TV of at least size 55" along with necessary graphic software along with licensed firmware & key and associated accessories which shall be suitable for interface with the DCS system of the plant. One number shall be located in the control room and other shall be in the machine hall floor.

v) One (1) fire alarm printing device to be located in the control room,

vi) One (1) set of microprocessor based digital EPABX system for fire alarm system along with minimum 30 nos. individual stations distributed strategically throughout the plant.

29.1.4 Miscellaneous items

ii) Four (4) hours fire rated penetration seals, fire barriers, fire dampers etc., as per approved drawings,

i) Signal and evacuation signs installed in the plant areas in accordance with the specification and the codes,

ii) Five (5) sets of fireman suit and five (5) nos. self-contained breathing apparatus, one (1) nos. suitable filling arrangement of SCABA cylinder and other safety/rescue equipments,

iii) Five (5) full face mask respirator with 10 no of suitable replaceable gas & particulate cartridges for control room, 10 nos. of half face mask with 30 nos. of suitable replaceable gas & particulate cartridges for GIS and 30 nos. of half face mask with 50 nos. of suitable replaceable gas & particulate cartridges for service bay area along with their lockers. The type of filter cartridges shall be decided during detail engineering.

iv) Fifty (50) nos. of full eye safety googles, fifteen (15) nos. of full body safety harness, ten (10) packets of 50 nos. of ear plug and twenty (20) nos. of ear muffler.

iii) Five (5) nos. of fire blanket/cloth roll for welding application in generator barrel, over cable trays/XLPE cable and critical areas.

v) Necessary pressure indicating devices for fire water headers and level sensing/ indicating and remote monitoring devices for fire tank.

vi) Coordination and provision of necessary contacts and/or ports for integration with plant SCADA system.

vii) Spare parts in accordance to clause 29.8 “Spare Parts” of this section.

viii) Tools and instruments in accordance to clause 29.9 “Tools and Instruments” of this section

Any other item(s) not mentioned specifically but necessary for the satisfactory completion of work defined above, as per accepted standard(s) best international practices.

29.2 Specific Parameters and Layout Conditions

29.2.1 Layout and General Arrangement

The water for fire fighting system shall be drawn from the tail race after Draft tube gate by two pumps of adequate capacity which draw water through DN 250 embedded pipe along the tail race and shall discharge water into fire water tank to cater water requirement of entire area. To cater water requirement of pothead area and cable tunnel, Transformer cum GIS Cavern due to location of Fire water tank , two (2) booster pumps (one electric driven & one diesel driven) each having 100 % capacity required along with local control panel, instrumentation and associated accessories, installed near main fire tank of adequate capacity, which shall draw, water through the main fire water tank along with distribution pipe header.

Two Bore well pump of adequate capacity shall also be provided as an alternate source for firewater tank at approx. El. 1400.00 M(tentative).The schematic arrangement has been detailed in drawing no. NH/DEM/URI-I ST-II/FF/01.

The main fire water header drawing water from the tank shall be installed in the powerhouse spanning the length of the Power house. Sub-headers in Power house, control block, transformer cum GIS Cavern, cable tunnel, area shall be laid to distribute the fire water to deluge system for oil filled transformers, oil pressure unit, generators, sprinkler system and hydrants at various floors/area as shown in the schematic diagram. To prevent excessive pressure in any of the headers/ pipe network due to elevation difference etc. Suitable pressure reducers/ orifices shall be provided. The fire tank shall be placed approximately at El. 1400.00M (tentative), exact location shall be decided during detailed engineering and have a capacity of at least two (2) hours

supply to meet the largest fixed fire suppression demand plus the maximum hose stream demand of not less than 1890 LPM meeting the NFPA standard shall be provided. The capacity of the tank shall also take into consideration for shaft seal water requirement for all units for at least 3 hours, besides the basic requirement of fire fighting water. Inlet filling header from pump to main tank and outlet pipeline header from tank shall be separate. The main filling tank header shall be interconnected to the fire header at suitable elevation with adequate number of valves so as to use the fire pumps directly for feeding the fire header if required and shall be decided during detail engineering. The tank shall have level switches for automatic starting and stopping of fire pumps. Level sensor of radar type shall be provided in fire tank.

The type of fire fighting arrangement for various equipments with sensing devices is given below.

S. No.	Equipment/ Area	Fire sensing devices	Fire fighting arrangement
1	Oil pressure unit of governor, main inlet Valve	Temperature sensing bulbs	High velocity Water (HVW) spray system,
2	Generator	Smoke and heat Detectors, Aspirator Type smoke detectors, Manual pull station	High velocity Water (HVW) spray system (Included under Generator scope of supply)
3	Excitation Cubicle	Aspirator Type smoke detectors	Portable fire extinguishers and Fire hydrants
4	Generator transformers & Bus Reactors	Temperature sensing bulbs. Manual pull station	High velocity Water (HVW) spray system. In addition to above, Nitrogen injection fire fighting system (Included under GSU Transformer & Bus Reactors scope of supply)
5	Cable spreading area	Multi sensors (heat and smoke detector), digital linear heat sensing cable/optical fibre based digital LHS cable, Manual pull stations	Water sprinkler system with electrically safe nozzle for cable spreading area.
6	Cable tunnel/ trenches	Multi sensor and/or Digital linear heat	Medium velocity Water (MVW) spray

S. No.	Equipment/ Area	Fire sensing devices	Fire fighting arrangement
		sensing cable/optical fibre based digital LHS cable, Manual pull stations	system and Fire hydrant
7	Control, computer & communication room	Multi sensors (heat and smoke detector), Aspirator Smoke detectors Manual pull station	Portable fire extinguishers Water Sprinkler System and Fire hydrants
8	Offices, conference room, pantry etc.	Multi sensors (heat and smoke detector), Aspirator type smoke detection system/ photoelectric detector Manual pull stations	Portable fire extinguishers Water Sprinkler System and Fire hydrants
9	Control block floor Mechanical and Electrical Utility Areas	Multi sensors and/or photoelectric detector, Manual pull stations	Water Sprinkler system, Portable fire extinguishers and Fire hydrants
10	Power house floors	Multi sensors or Beam detectors Manual pull stations	Portable fire extinguishers and Fire hydrants
11	Transformer cavern	Multi sensors and /or Beam detectors Manual pull stations	Portable Fire extinguishers and Fire hydrants
12	Pothead yard area	Manual pull station	Portable Fire extinguishers and Fire hydrants
13	DG room	Beam detectors and / or heat detectors Manual pull stations	Water Sprinkler system, Portable fire extinguishers and Fire hydrants
14	Bulk Oil storage tank (HSD)	Temperature detectors Manual pull stations	Water Sprinkler system, Portable fire extinguishers and Fire hydrants
15	GIS Cavern including control	Multi sensors Beam detectors Manual	Portable fire extinguishers and

S. No.	Equipment/ Area	Fire sensing devices	Fire fighting arrangement
	& Panel room	pull stations	Fire hydrants
16	Other miscellaneous areas	Photo-electric detectors and/or heat detectors Manual pull stations	Portable fire extinguishers and Fire hydrants
17	Cable alley, CT & PT compartment of 11 kV system	Heat sensitive polymer detection tube	Clean agent automatic direct low pressure fire suppression system
18	Field discharge resistor and breaker compartment of Excitation panel		
19	Excitation transformer, Unit Auxiliary transformer, Station Auxiliary transformer		

It is the responsibility of the Contractor to complete the system in all respects. Any item/ equipment not covered above but which are necessary for safe working of the entire power plant, shall be furnished by the Contractor. However, the same shall further be finalised during detailed engineering.

Suitable means or arrangement shall be ensured for isolation of fire and smoke in the power plant.

Fire fighting equipment pertaining to generators, as covered in chapter 5 Generator chapter, however the header of firefighting shall be provided near the generator barrel at desired pressure.

Nitrogen injection system pertaining to GSU Transformers is covered in chapter 8 GSU Transformers chapter.

Nitrogen injection system pertaining to Bus Reactors is covered in chapter 9 Bus Reactors chapter

29.2.2 Design considerations

i) A looped conduit system shall be provided so that if the conduit and all the conductors get severed at any point, the initiating device circuit, signal line circuit and notification appliance circuit shall remain functional,

ii) The implementation of the communication technology for fire signalling system shall be such to compensate for any failure to communicate a signal by eliminating the risk of missing even a single fire alarm signal,

iii) Addressable system in the control panel shall be advanced microcomputer based system,

iv) The time delay between the activation of an initiating device and the automatic activation of a local fire safety function shall not exceed ten (10) seconds,

v) Detectors shall be located at strategic position and arranged in zones to facilitate proper indication of fire location, transmission of audio-visual signals to fire control panels and actuation of the appropriate fire fighting system,

vi) Detectors installed in concealed areas shall have suitable visual indication in a visibly located area.

vii) Necessary fire barriers of suitable resistance rating and smoke control barriers shall be provided to prevent transmission of the fire and smoke from one area to another in accordance with relevant standards.

viii) Contractor shall give due consideration to ensure aesthetic of the powerhouse areas. Necessary coordination with the architectural work contractor shall be made while finalising the system.

ix) Necessary smoke and heat venting shall be planned for areas identified by fire risk evaluation, carried out by the Contractor, where either the heat or smoke or both shall be vented from its place of origin directly to the outdoors. The Contractor shall ensure the necessary co-ordination with ventilation contractor for the same to ensure proper functioning in emergency situations.

29.3 Rating and Functional Characteristics

29.3.1.1 Pumps

(A) Fire pumps

Each pump shall have 100 % capacity to meet the flow requirement of largest deluge system or sprinkler and hydrant system combined whichever is higher at required pressure but in any case shall not be less than the capacity to fill the tank within four (4) hours. The Contractor shall coordinate with generator and transformer manufacturer to assess the water requirement for deluges/sprinkler and incorporate the same while finalizing the pump capacity. The design head for pumps shall be sufficient to fill the fire tank. The fire pump-motor set shall be suitable for fire application and shall meet the applicable design standards/NFPA

The pumps shall be of horizontal centrifugal type complete with continuous duty electric motors with class F insulation (temperature rise limited to class B), control panels, cables, anchor bolts and other mounting materials. The motor shall be suitably sized to drive the pump continuously over the specified characteristics without getting overloaded. Pump shall be capable of furnishing not less than 150% of rated capacity at a head of not less than 65% of the rated head. The shutoff head shall not exceed 120% of rated head. The motor rating shall be at least equivalent to the horse power required to drive the pump at 150% of its rated discharge. The

diesel driven booster pumps shall comprise of diesel engine with all accessories, pump, exhaust system, battery & charger (float & boost mode), fuel tank for minimum of 6 hr running capacity continuously etc.

(B) Bore well Pump

The Bore well Pumps shall be vertical shaft type centrifugal pump with direct mounted motor. The design head and ratings for pumps shall be sufficient to fill the fire tank at desired pressure and the same shall be decided during detail engineering.

The material of the impeller & casing shall be stainless steel and cast steel/ grey cast Iron respectively. The pump shall be suitable for 415V ± 10%, 50 HZ ± 5% with contacts for remote operation/indication.

29.3.1.2 Headers and piping

The fire header and piping shall be looped and of sufficient size to supply the flow requirements at any point in the loop considering the most direct path to be out of service. Fluid velocity in the main headers shall normally not exceed 4.0 m/s. Pipe sizes shall also be designed to accommodate any future expansion/ water demands. The design of header and branches shall be such that it could be sectionalised floor wise for maintenance purpose without disturbing the other floors.

29.4 Performance Guarantee

The fire fighting system along with all auxiliaries and accessories shall be capable of performing intended duties under specified conditions. The Contractor shall guarantee the reliability and performance of the individual equipment as well as of the complete system.

29.5 Design and Construction

29.5.1 Standards

The system and equipment shall be designed, built, tested and installed to the latest revisions of the following applicable standards. In the event of other standards being applicable they will be compared for specific requirement and specifically approved during detailed engineering for the purpose:

S. No.	Standards	Description
1	NFPA 851	Recommended practice for fire protection for hydroelectric generating plants
2	NFPA 72	National Fire Alarm Code
3	NFPA10	Standard for portable fire extinguishers
4	NFPA13	Standard for the installation of sprinkler

S. No.	Standards	Description
		systems
5	NFPA 14	Standard for the installation of stand-pipe, private hydrants, and hose systems
6	NFPA 15	Standard for water spray fixed systems for fire protection
7	NFPA 20	Standard for the installation of stationary fire pumps for fire protection
8	NFPA 75	Standard for the protection of electronic computer/ data processing equipment
9	NFPA 1221	Standard for the installation, maintenance, and use of emergency services communications systems
10	NFPA2001	Standard for Clean Agent Fire Extinguishing Systems

29.5.2 Fire pumps

The material of the pump impeller and casing shall preferably be stainless steel (AISI 316 or better) and cast steel(ASTM A 216WCB or better) /grey cast iron respectively. The selected impeller material shall have excellent abrasion and corrosion resistant properties. The material of shaft, sleeve and key shall be stainless steel (AISI 410 or better).

Pump bearings shall be grease lubricated.

The pumps shall be complete with continuous duty electric motors with class F insulation (temperature rise limited to class B), control panels, anchor bolts and other mounting materials complying with suitable Indian and International Standards. The motor shall be suitably sized to drive the pump continuously over the specified characteristics without getting overloaded. The pumps shall be suitable for 415V ± 10%, 50Hz ± 5% with contacts for remote operation / indication. The speed of pumps shall not be more than 1450/1500 rpm. Mechanical seals made of tungsten /silicon cemented carbide material shall be provided for pump.

The pump shall be automatically operated as per the requirement of water in tank. Pressure gauges shall be provided at the inlet and outlet of the pumps. Pressure switches/ flow switch with suitable numbers of potential free contacts for remote indication and alarm shall be provided for each pump. Shut-off valves and check valves shall be provided to allow disconnection and switching of each pump. Suitable alarm annunciation for non-functioning of the pumps shall also be provided in the control room/ unit.

The design capacity of all the pumps shall have a minimum safety margin of 10% over and above the duty point i.e. desired flow and corresponding head.

Adequate arrangement shall be provided to prevent the pump from rotation in reverse direction.

29.5.3 Automatic self cleaning simplex Strainer

The automatic back wash strainer shall be heavy duty preferably wedge wire candle self-cleaning skid mounted type suitable for continuous duty to arrest debris, tree leaves, pebbles, coarse sand etc that may appear in the water. The filter shall comprise of stainless steel candles and shall have cast steel body of seamless pipe. One (1) no. automatic drain valve (size not less than 80 mm) which shall operate on the basis of both i.e. set time and differential pressure shall be provided. In addition to automatic drain valve, an additional valve for manual drain valve shall also be provided of same size (not less than 80 mm). Automatic control shall be integral part of the automatic filter. Strainer shall be fitted with swing type bolt and davit arm arrangement for quick opening for easy maintenance. The geared motor arrangement shall be designed other than the top position. Proven scrapper arrangement for self cleaning shall be provided.

The pressure drop shall not be more than 0.2 bars. Pressure sensors shall be provided for differential pressure indication across the filters. The filter shall preferably be capable of removal of all material as small as 500 micron. The free flow area ratio of filter shall be 1:5.

29.5.4 Y Strainer

Automatic Y strainer with stainless steel element (stainless steel of 316 or better) shall be provided. One (1) no. automatic drain valve (size not less than 80 mm) which shall operate on the basis of both i.e. set time and differential pressure shall be provided. In addition to automatic drain valve, an additional valve for manual drain valve shall also be provided of same size (not less than 80 mm). The shell of strainer shall be made from seamless pipe. The pressure drop shall not be more than 0.2 bars. Pressure sensors shall be provided for differential pressure indication across the filters. The filter shall preferably be capable of removal of all material as small as 1500 micron.

29.5.5 Overhead fire tank

The fire tank shall have suitable type of level switches and radar type level transmitter in the control panel for automatic starting and stopping of the fire pumps and remote level indication. The capacity of the tank shall also take into consideration at least requirement of all units of shaft seal water for 3 hours, besides the basic requirement of fire fighting water. The tank shall be of reinforced concrete and the civil works of tank shall be done by the other Contractor. The tank shall be suitably compartmentalised along with its level switches, level transducers and level indication for inspection, cleaning or repair maintaining 50% of design capacity.

The tank "status" shall be properly annunciated in the main control room. Cabling of all the sensors, level switches etc. should be laid in suitably clamped PVC conduits in the tank .

29.5.6 Electro Magnetic water flow switches

Electro Magnetic water flow switches for each outlet from the cooling water pumps shall be provided. All flow switches shall be provided with suitable numbers of independent, adjustable, potential free contacts for low flow alarm and protection purposes.

29.5.7 Electro Magnetic water flow meters cum switches

Electro Magnetic water flow meters cum switches for each distributing manifold shall be provided. All flow meters shall be provided with local as well as remote display and interface for integration to plant SCADA system along with suitable numbers of independent, adjustable, potential free contacts for low flow alarm and protection purposes.

29.5.8 Piping, valves and appurtenances

All required pipes, flanges, fittings, supports, fasteners, valves and other related material necessary for completion of the system shall be supplied as a part of this contract. All embedded and exposed piping shall be of seamless of minimum schedule 80. All gravity drain pipes shall be seamless minimum schedule 40. Heavy duty gate valves suitable in fire application shall be used in fire fighting system for isolation and control. Pipes crossing roads, trenches etc. shall be provided with mild steel sleeves. Water pipes shall be be insulated against condensation with elastomeric foam based on synthetic rubber (NBR) or approved type insulation/lagging with vapour proof cover.
Check valves of size 150 mm and above shall be of dashpot assisted check valves and size below 150 mm, dual plate check valve (Silent type) shall be used. The piping and valves material shall be in accordance with clause 5.7"Piping, Fittings, Valves, and Heat Exchangers" of General Technical Specification (GTS).

Fasteners used for supports of pipelines shall be chemically grouted through anchor fastener and heavy-duty supports shall be provided for the same.

All flanges shall be of grooved type with O-ring arrangement.

Automatic air purging valves at suitable location shall be provided for all headers at suitable locations

29.5.9 Fire detection devices

29.5.9.1 Automatic fire detectors

The detectors spacing and rating shall be in accordance with the applicable standards/codes and shall have UL approval.

The smoke detectors shall be designed with minimised effect of environmental conditions like air velocity, altitude, humidity, temperature, colour of smoke, electrical and mechanical influences like abnormal pressure or vibration and the influence of aerosols and any particulate matter. It shall be plug-in type with detector base containing terminals for making connections. The detectors shall be assembled and engineered for flush or surface ceiling mounting with a standard outlet box.

Provision of visual indication of detector's alarm condition shall be visible from a distance of six (6) m and visually different from indications of other conditions. The openings of the smoke entry shall be at least thirty (30) mm below the ceiling level assumed to be smooth and flat.

A) Thermal detectors

Thermal/ heat detectors shall be designed to operate when the rate of temperature rise at the detectors exceeds a predetermined value irrespective of the actual temperature. It shall be possible to reset detectors after attending the alarm.

B) Multi sensors

Multi sensors shall be state of the art and operate on sensing of smoke and heat both. The selected sensors model shall be suitable for the different type of smoke.

The spacing shall be in accordance to the relevant standard.

C) Digital LHS cable/Optical fibre based Digital LHS cable

Heat sensing cable shall permits early detection of fire or overheating. The cable shall be digital type and set to give an alarm signal in the range of 79 to 90 deg. C.

D) Optical beam detectors

Beam detectors shall be reflector type linear optical beam smoke detectors operate on principle of light obscuration utilizing infrared beam. The beam type detectors are envisaged to used in ceiling height 10m or above for detection of fire/ smoke.

E) Photo-electric detectors

Photo-electric detectors shall be self compensating type and shall have an obscuration rate in accordance with suitable standards. Detectors shall not initiate alarm during failure of its LED light source.

Any other suitable type detectors required can be acceptable subject to acceptance during detailed engineering.

29.5.9.2 Manual pull stations

The manual pull station shall be intelligent addressable type suitable for surface mounting. The manual pull stations shall preferably be located at access ways within a distance of 1.5m from the exit doorway opening at each exit on each floor and distance to the nearest pull station measured horizontally on the same floor shall normally not to exceed 50m.

The coded manual pull station shall produce at least three (3) repetitions of the coded signal, with each repetition to consist of at least three impulses.

The lever of the manual pull stations shall get locked after manual activation till it is reset. The front colour of the station shall be fire red with white inscription as per relevant standards.

29.5.9.3 Aspirator smoke detectors

Generators, Excitation cubicles and control & communication room shall be provided with aspirator type smoke detection system for earliest warning of a potential fire in incipient stage.

Suitable pipe work for drawing the sample air continuously from the generator housing/ other protection area shall be laid and the Contractor shall critically study the configuration of the area and the associated problems for designing and installing the smoke detection system. Aspirator type smoke detection system with display unit based on laser technology shall be provided.

Suitable interfaces shall be provided for supervision of the real time data through plant SCADA. Provision for multiple alarm levels at least three levels with programmable relays shall be made. The licensed firmware with key/password of OEM shall be provided.

29.5.10 Notification devices

If an alarm in a fire zone occurs, siren, electric hooters with strobe electric /bells/horns/ speakers, light or text displays providing audible, tactile, or visible outputs or any combination thereof shall be actuated. The number of these items shall be sufficient to alert the complete zone. These devices shall have separate screw terminal for each conductor and the sounders/audible appliances shall generate sound in the range of 500-1000Hz different from the equipments and other devices provided in the area and in the building.

A minimum sound level of either 5dB (A) above any other noise likely to persist for a period longer than 30 seconds or 65dB (A), whichever is greater but not exceeding 120dB (A) shall be produced by the sounders at any point which can be occupied in the building. Audible notification appliances shall be so selected and placed that they are sufficiently intelligible with adequate audibility and clarity minimising any kinds of distortion in an electro acoustic system.

Visual notification appliances shall conform to the applicable standards and shall be surface mounted.

29.5.11 Fire suppression system

29.5.11.1 Hydrant systems and hose reels

Fire hydrants and its components shall be designed and installed in conformity to relevant code/standards. Hose reels with shut-off nozzle shall preferably be installed in recesses so that they do not form obstruction on a route of escape and shall be located in

accessible positions at each floor level adjacent to exits in corridors on exit routes.

The spacing of hydrants shall be in accordance to the relevant national/ international standards. In addition, hydrant shall be provided between the units in upstream & downstream side of powerhouse on all floors.

The space requirement, location, maximum overall size, component case, water supply for hose reels, materials, appliances etc. shall be in accordance with relevant standards. The hose stations shall be so positioned so that two streams can be directed to any location.

29.5.11.2 Water sprinkler and spray systems

Each of the high velocity water spray system shall consist of a deluge valve, pressure switches, distribution piping, nozzles, thermal/heat detectors and a deluge panel. The deluge panel shall provide a connection point from the deluge system to the powerhouse annunciation and detection system, as well as transferring the signal from the heat detectors to the electrically operated deluge valve. Deluge valves for Generator Transformers shall be capable of electrically operation from Buchholz relay, PRV and GT Differential relay (in UCB).

Each deluge system shall consist of an electrically monitored isolating valve; normal dry/wet distribution piping, flow/ pressure switch and bulb type monitoring system which automatically gets activated at a rated temperature.

The Contractor shall coordinate the system design with all oil filled transformers manufacturer(s) to assure complete transformer protection system and to design the water requirement. Generator Transformers are also provided with Nitrogen injection system for fire protection. Contractor shall coordinate for interfaces if any with Generator transformer vendor.

Each sprinkler system shall consist of an electrically monitored isolating valve; normal wet distribution piping flow/ pressure switch and glass type sprinklers which automatically get activated at a rated temperature.

All automatic sprinklers shall have temperature-sensitive sealing. The type, size and design of each sprinkler installation used in the system shall be appropriate to the hazards covered by the installation.

All exposed metalwork in systems shall be efficiently earthed to prevent the metalwork becoming electrically charged.

The temperature rating of a sprinkler shall not be less than 30ºC greater than the highest expected ambient temperature of the location. Sprinklers shall be made of preferably Stainless steel or suitably coated with corrosion-resistant material.

The system design and equipments shall be in accordance with relevant standards. All sprinklers etc. shall be UL or equivalent approved make.

29.5.11.3 Clean agent Automatic Direct Low Pressure Fire Suppression system employing heat sensitive polymer detection tube for electrical panels etc.

The clean agent automatic fire suppression system shall be installed in the following electrical panel / compartment:

- Cable alley, CT & PT compartment of 11 kV system,
- Field discharge resistor and breaker compartment of Excitation panel,
- Dry type transformers - Excitation transformer, Unit Auxiliary transformer, Station Auxiliary transformer

29.5.11.4 System description

1) The clean agent automatic direct low pressure system shall consist of Cylinder filled with clean agent fire-fighting gas, cylinder valve assembly along with its mounting arrangement & supports, heat sensitive polymer tube along with necessary fittings, End of line adapter, Pressure switch, pressure gauge & other associated accessories etc. and Audio-visual indication unit.

2) The clean agent gas shall be halon free, waterless and has property to vaporizes when released. It shall have least Global Warming potential (GWP). It shall be suitable to extinguish class A, B and C fire hazards. It shall be non corrosive, non toxic, non inflammable, environment friendly and not electrically conductive to avoid any damage to the electronic cards, electrical devices etc. The clean agent shall have non residue property to avoid any cleaning of panels after release.

3) Each clean agent extinguishing unit shall be equipped with its own automatic heat sensing discharge tubing system, which when punctured, automatically releases the suppression agent into the electrical panel / transformer.

4) Clean agent cylinder / container shall be a part of UL/FM/VDS/LPCB listed/approved system. Further, cylinders shall have hydrostatic test pressure certificate and shall have their serial number and explosive certificate approval by Chief Controller of Explosives (CCOE) – India (if applicable). Each container shall be equipped with a valve, a pressure gauge to monitor container pressure, etc.

5) A pressure switch shall be connected at the other end of discharge tubing or on main valve to monitor system pressure and/or signal of system actuation, etc.

6) Necessary electrical supply upto fire control panel and cable for power supply & SCADA communication shall be in the scope of contractor.

29.5.11.5 Design Requirement

1) Design concentration of clean agent used shall be as per NFPA-2001 / manufacturer's recommendation.
2) Total volume of every electrical panel shall be considered for estimation of clean agent quantity and shall be decided during detail engineering.
3) All documents/drawings related to design of the system shall be vetted by the system manufacturer before submission to NHPC for approval.
4) The Contractor shall make provision of contacts and/or ports in local control cubicles for interfacing with SCADA system for monitoring.

29.5.11.6 Portable fire extinguishers

The type and number of portable fire extinguishers shall be determined on the basis of classification of fires anticipated in the area, the construction and occupancy of the individual property, ambient temperature conditions etc. Portable fire extinguishers shall preferable be water type, dry chemical (DCP), CO2 type, foam type etc. and free from agents which are non-eco friendly such as Halon. The fire extinguishers shall be provided with hydrostatic test pressure certificate, their serial number and explosive certificate from PESO.

29.5.12 Fire alarm, supervision and signalling system

29.5.12.1 Fire detection, alarm and supervision

The fire alarm and detection system shall be a completely supervised fire alarm reporting system, which shall be activated into the alarm mode by the activation of any of the alarm initiating devices in the event of fire. The system shall remain in the alarm mode until the initiating device is reset and the fire alarm control panel is reset and restored to normal.

All alarms coming from the detectors shall be line wise transmitted to the main fire alarm panel. The alarms of the system shall be transferred first to the respective panels for activating the fire suppression systems. In parallel, each line shall be printed out on a fire alarm printer and indicated at video display units (VDU).

29.5.12.2 Power supplies

Fire alarm systems shall be provided with at least two independent and reliable power supplies, one primary and one secondary (standby), each of which shall be of adequate capacity for the application and performance of the fire alarm system. The Contractor shall coordinate with the plant DC system manufacturer in designing and supplying the necessary cables, connections, interfaces etc. for the secondary power supply of the fire alarm panel. The Contractor shall fully ensure that the changeover from

primary supply to secondary supply and vice-versa shall be fully automatic without affecting the transmission of signal via the fire reporting system upon operation of the initiating devices.

29.5.12.3 Fire alarm control panels

The automatic addressable and intelligent fire alarm system is to be built with modern, redundant system structure and microprocessor-controlled detectors. All control unit elements of the fire alarm system, i.e. CPU, Loop card, Networking card, Panel mounted relay cards shall be designed to be fully 100% redundant. If any faults occur in the control unit or peripheral devices, all detectors and functions remain intact and all controls continue to be active.

The main and repeater fire alarm control panels shall provide automatic, supervised, multi zone detection and alarm system. Each fire alarm panel shall be of modular type, installed in a mounted steel cabinet with hinged door and cylindrical lock. The panels shall be clean, uncluttered and orderly assembled containing all necessary operating and supervising elements/ components, using a solid state technique. The start-up shall be automatic after restoration of power either primary or secondary. Signals and LEDs together with visual annunciation shall be provided to indicate by zone any alarm, supervisory or trouble condition on the system as an integral part of the control panel with suitable identification.

The operational features of the modules shall have at least the following. Other additional features required to make the system fully functional shall also be incorporated in accordance with relevant standards.

i) Monitoring electrical supervision of different circuits viz. initiating device circuits, circuits used for supervisory signal services viz. sprinkler water-flow, water level indicators etc.,

ii) Monitoring electrical supervision of power supply, transmitter tripping circuit integrity etc.,

iii) Trouble buzzer and trouble LEDs against any fault due to loss of power supply, single break, open, or ground fault condition, panel fault and panel door open etc. impeding the normal functioning of the system,

iv) Evacuation alarm signal switch and transmitter disconnect switch,

v) Confirmation or verification of all smoke and heat detectors,

vi) Provision of supervised addressable relay for HVAC shut-down which shall not be overridden at the HVAC panel. Fire relay panel at convenient location e.g. control block top, GIS area etc. shall be provided for fire input for HVAC system,

vii) Monitoring and control of fire sprinkler system, release of deluge system and other fire extinguishing system,

viii) Control panels and field panels shall have suitable software programme enabling expansion and modification of the

system without replacement of hardware or firmware viz. addition or deletion of zones etc.

An alarm condition in the circuit which shall automatically annunciate in the mimic and shall have at least the following functions to make the system fully functional. These alarms shall also be printed out.

a) Transmission of signals to the plant SCADA system. Fire relay panel at convenient location shall be provided for alarms and indications input for SCADA system,

b) Transmission of signal to the station security and surveillance system,

c) Visual indication of the alarm device on the fire panel control panel display,

d) Continuous operation and sounding of alarm notification appliances as per the applicable standards,

e) Operation of smoke control system and de-activation of air handling units in the alarmed area,

f) Automatic discharge of the respective fire suppression system with maximum 15 seconds delay for deluge system and 30 seconds for wet pipe system.

Provision of necessary contacts/ports for control, monitoring, supervision and alarm functions shall be made in the fire alarm control panels for duplicating these functions in plant SCADA system.

Unacknowledged alarm signals shall not be interrupted if a fault on a fire detector circuit or a signalling line circuit occurs while there is an alarm condition on that circuit.

All major devices installed in the panel shall have 10% spare capacity. Fire alarms, supervisory signals and trouble signals shall be distinctively and descriptively annunciated.

29.5.12.4 Fire Work Station and Video display unit

The video display unit shall show the plant appearance with fire zones with the alarm indication. The fire work stations provided in the main control room shall have 32” LED flat screen colour monitor, processor CPU, minimum 16GB RAM, DVD-ROM drive, key board, mouse etc.

The video display unit for machine hall and control room shall be at least 55” large screen smart TV display or better along with graphic display including all standard accessories.

If an alarm, fault or release occurs, the pertaining graphics shall be activated. After acknowledgement the horn shall be silent and the light shall remain steady and go off after resetting.

At least following information shall be included in the graphics:

i) Alarms,

ii) Release signals,

iii) Air conditioning and ventilation fire dampers and plant stops,

iv) Release commands,

v) Evacuation signal release for sections,

vi) General plant evacuation release.

29.5.12.5 Signs and evacuation signals

For deluge areas, the warning signs and releasing signs according to applicable codes may be installed.

Laser type exit and evacuation route signs shall be installed throughout the plant as to be finalized during detailed engineering. Exit/Fire signs with battery backup shall also be provided at strategic locations, which shall be finalised during detail engineering.

29.5.12.6 Fire alarm printing

Fire alarms printing shall be printed in the alarm printer installed in the central control room.

The printers shall have a memory, which enables the printing system to print out the alarms and events in the sequence they occur. The printer shall be colour laser printer capable of printing A4 size papers with the speed of at least 4 pages per minute.

29.5.12.7 Fire alarm bus interface

Signals going to the alarm printer shall also be transferred to the main data logger via a bus coupler system in the sequence they occur.

The signals shall be stored in the main data logger for at least one year, shall be retrievable via the bus system from the fire work station and be printed out through alarm/ event printer on request.

29.5.12.8 Fire telephone

An emergency EPABX fire telephone system shall be installed throughout the plant based on a two-way communication system connecting the individual locations with the central control room. The priority features shall be assigned to fire telephone stations in the main control room and GIS control room.

29.5.13 Name plates and external indicators

For an easy identification, each detector and manual pull station shall be equipped with a nameplate showing at least line number, detector identification number and fire zone number.

29.5.14 Fire barriers, assemblies and interior finish

All fire barriers shall have fire resistant classification for minimum 4-hour exposure rating or as specified in applicable codes. Openings in such barriers should be provided with fire door assemblies, fire

dampers, penetration seals (fire stops), or other approved means having a fire protection rating consistent with the designated fire resistance rating of the barrier. All cable floor and wall openings shall be sealed with 4 hr fire rated suitable seals. Penetration seals provided for any electrical and piping openings should meet the requirements of suitable rating in accordance with applicable ASTM or other International Standards. Cellular or foam plastic materials shall not be used as interior finishing material for subsurface structures and in areas critical to fire. Material shall be suitably tested as per International Standards prior to their usage for interior finish.

29.5.15 Cable and wires

The cable, wires and conduit/ raceways shall be in accordance with relevant standard. All the ~~power,~~ control and loop cable used in fire detection ~~protection~~ system shall be fire survival cable designed to withstand 950 deg.C fire for at least three hours.

29.6 Drawings, Documents and Design Calculations

29.6.1 Design memorandum

The Contractor shall submit to Employer a design memorandum prepared in accordance to clause 1.6 “Record and Documentation” of “Section 1- General Technical Requirements.”

29.6.2 Drawings and documents

The Contractor shall submit all the drawings and documents in accordance with requirements stipulated in “Section 2 - Technical Documents” of “General Technical Specification (GTS)”.

29.6.3 Design calculation

The Contractor shall submit the design calculation in accordance to Clause 2.4 of “General Technical Specification (GTS)” covering at least the following, for review / acceptance.

i) Design Memorandum

ii) Pipe sizing and pressure drop calculation,

iii) Selecting the pump capacity and working head for pumps,

iv) Size of the fire tank,

v) Deluge system pressure drop calculation for transformers, generators, cables, OPU system etc.,

vi) Sprinkler system for stores, cable trays and offices area,

vii) Selection of numbers and type of automatic fire detectors, manual pull stations including types and quantities of notification appliances like bells, horns, speakers, flashlights etc.

viii) Cylinder size calculation for clean agent automatic direct low pressure fire suppression system.

29.7 Delivery, Installation and Commissioning

The Contractor shall follow the requirements of Delivery, Installation and commissioning elaborated in clause 1.7 “Delivery, Installation and commissioning” of “Section 1 - General Technical Requirements.”

29.8 Spare Parts

Recommended spare parts shall be supplied in accordance to clause 1.8 “Spare Parts “ of “Section 1 – General Technical Requirements”. Specified spare parts to be supplied under this section are as follows:

S. No.	Description	Quantity
1.	Complete Fire pump with motor	
a.	Complete pump with motor	1 no.
b.	Impeller	2 nos.
c.	Wear rings set	2 nos. of each type
d.	Pump mechanical seal	6 nos. of each type
e.	Motor bearings	6 nos. of each end
f.	Pump bearings	6 nos. of each end
g.	Set of seal and gasket for pump	3 sets.
2.	Complete Bore well Pump with motor	
a.	Complete pump with motor	1 nos.
b.	Impeller	2 nos.
c.	Wear rings set	3nos.
d.	Pump mechanical seal	6 nos. of each type
e.	Motor bearings	6 nos. of each end
f.	Pump bearings	6 nos. of each end
g.	Set of seal and gasket for pump	3 sets
3.	DG/Electric driven booster pumps	
a.	Complete pump with motor	1 no.
b.	Impeller	2 no.
c.	Wear rings set	2 nos. of each type
d.	Pump mechanical seal	6 nos. of each type
e.	Motor bearings	6 nos. of each end
f.	Pump bearings	6 nos. of each end
g.	Set of seal and gasket for pump	3 sets of each end

S. No.	Description	Quantity
4.	Set of Filter element for filter of each type	1 set of total quantity used in one simplex filter assembly
5.	Multi sensors, photoelectric detector and heat detectors	10 nos. of each type
6.	Modules & cards of deluge control panel	10 nos. of each type
7.	Isolator modules	10 nos.
8.	Hooters cum strobe	10 nos. of each type
9.	Siren	1 nos. of each type
10.	Solenoid valves	20 nos. of each type
11.	Electric plug-in cards for the main and repeater panels	2 no. of each type
12.	Electric plug-in cards for the sub panels/local panels	1 no. of each type
13.	Aspirator type detector module	2 nos. of each type
14.	LED installed in the system	10 nos. of each colour (Red, Green, Yellow, Blue, Amber etc.)
15.	Intelligence interface unit for pressure switch	5 nos. of each type
16.	Digital LHS cables /Optical fibre based linear heat sensing cable	500 m
17.	Nozzles for HVW and MVW water spray system.	20 nos. of each type and size
18.	Deluge valves	10 no. of each type & size
19.	Complete set of inside components of deluge valves	05 nos. of each type and size.
20.	Sprinkler valve	5 nos. of each type & size
21.	Manual pull station	10 nos. of each type
22.	Hydrant valve	5 nos. of each size and type
23.	Pressure gauges	25 nos. of each type and size
24.	Pressure switches	25 nos. of each type and size
25.	Under voltage relays	2 nos.

S. No.	Description	Quantity
26.	Copper tubes for instruments	25 meters of each size used
27.	Bulb Detectors	25 nos. of each type
28.	Over current and earth fault relays	2 nos.
29.	Fuses	10 nos. of each type
30.	MCCB and MCB	2 no. of each type
31.	Valves of size DN 80 and above	4 nos. of each type
32.	Complete Motorised valves of each type along with motor/ panel and other accessories	4 nos. of each type and size
33.	Spares for clean agent automatic direct low pressure fire suppression system.	
a.	Filled gas cylinder	5 nos. of each type used
b.	Heat sensitive polymer tube	20% of installed tube length of each type & size
c.	Pressure switch	02 nos. of each type used
d.	Cylinder regulating valve, End of line plug and & end of line Schrader valve set	02 set each of each type & size used.
e.	Seals & gasket	02 nos. of each type used
f.	Nitrogen gas cylinder with all accessories(approx..47 lts)	02 nos.

29.9 Tools and Instruments

The Contractor shall supply all necessary tools and instruments etc. for installation, repair and maintenance in accordance to clause 1.9 “Tools and Instruments” of “Section 1 - General Technical Requirements”.

29.9.1 Special tools

The Contractor shall list and supply all special tools. List of such tools including their make and detailed specification shall be submitted for acceptance by the Employer.

29.10 Quality Assurance and Testing

The Contractor shall follow the quality assurance and testing requirements specified separately in “Quality assurance and Testing Specifications (QTS)”.

ATTACHMENT-5B

B: SPECIFIC QUALIFICATION CRITERIA FOR SUB CONTRACTORS / VENDORS PROPOSED BY THE BIDDER

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
1.0	**TURBINE AND ACCESSORIES**			
1.1	**Fabrication & Manufacturing of Major Parts of Turbine**			
1.1.1	SPIRAL CASING/ STAY RING/ TOP COVER / BOTTOM RING / DRAFT TUBE CONE			The Contractor/Sub-contractor/vendor: i) Should have manufactured/executed *similar items/works* earlier during the last Twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units or at minimum one (1) Installation of at least four units. **or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency, in case of fabrication, forging & casting firms. In case of spiral casing, *Spiral Pressure Testing acceptance*

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				report shall also be certified by ordering agency. **Note: If Contractor/ Sub-contractor/ vendor meets the above Specific Qualification Criteria for "Stay ring (i.e. complete all parts together)", the said Sub-contractor/vendor shall be deemed to qualify Specific Qualification Criteria for other items i.e. Bottom Ring, Top cover, and Draft tube cone.** iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project. In all cases the main contractor has to certify the veracity of correctness of document that is being claimed. Note: 1. 'Similar item/work' is defined as 50% of (Dia. x Weight) of component of prototype turbine or higher. 2. The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
1.1.2	TURBINE SHAFT			The Contractor/ sub-contractor/vendor: i) Should have manufactured/executed *similar items/works* earlier during the last Twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations /Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units or at minimum one (1) Installation of at least four units. **or** iii) If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency, in case of fabrication, forging & casting firms. iv) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial
1.1.3	GUIDE VANE			
1.1.4	RUNNER			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				resources to manufacture the item(s)/ component(s) required for the project. Note: 1. 'Similar item/work' is defined as 50% and above size of likely dimension of components of prototype turbine as per below: i) Turbine Shaft: Outer dia.x Length ii) Guide vane: Width x Height iii) Runner:D3(Discharge Dia.) x H(Rated Head) 2. The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
1.1.5	SHAFT SEAL			The Sub-contractor/vendor: 1. Should have manufactured & supplied shaft seal of similar size during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. 2. The shaft seal so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units or at minimum one (1) Installation of at least four units. **Or** 3. If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar*

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				works i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency. 4. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) / component(s) required for the project. Note: 1. 'Similar size' is defined as shaft seal of Francis turbine of a Hydro Power Plant/ Pump Storage Plants / Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity or above. 2. The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
1.1.6	HP-HVOF COATING			The Contractor / Sub-contractor/vendor: i) Should have executed coating works using JP-5000 HP-HVOF System or equivalent having coating thickness of 250 micron or higher, minimum hardness of 1100HV, smoothness of 6 Ra or better, Porosity of 1% or better, bond strength of 10000 PSI or higher and particle velocity of 700 m/sec or higher for hydro turbine during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The testing report carried out by NABL accredited lab shall be submitted for

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				quality of material used for HVOF Coating. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to execute the work required for the project. Note: The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
1.1.7	SERVO MOTOR			The Sub-contractor/vendor: i) Should have designed, manufactured / executed turbine (Guide Vane) servomotor of at least 50% of required servomotor capacity (Stoke & Diameter) as per relevant IEEE and operating pressure range of 100-160 bar & above (considering two servomotors for turbine) during the last Twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The turbine (Guide Vane) servomotor manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units or at minimum one (1) Installation of at least four units. Or

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project. Note: The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
1.1.8	TURBINE DISCHARGE MEASURING EQUIPMENT (ULTRASONIC)			The Sub-contractor/vendor: i) Should have design, manufactured & supplied ultrasonic flow measurement equipment meeting requirement as per IEC 60041 during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations/ Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Or If the contractor (to whom LOA is placed by

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project.
1.1.9	SELF LUBRICATING BUSHES			The Sub-contractor/vendor: i) Should have manufactured & supplied similar item during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The Similar item so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations/ Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units or at minimum one (1) Installation of at least four units. **Or**

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project. Note: 1. 'Similar item' is defined as relevant item or component of "hydro turbine generator set of minimum 50% of rated capacity" of hydro turbine generator set / Pump Storage / Lift irrigation scheme. 2. The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
1.2	STEEL PLATES			The Sub-contractor/vendor: i) Should have manufactured & supplied similar item during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The Similar item so manufactured should have been in Installed /satisfactory operation for at least two years at minimum two (2) plants(Hydro Power Stations/ Pump

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				Storage Plants / Lift irrigation scheme /Industrial plants. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) plants(Hydro Power Stations/ Pump Storage Plants / Lift irrigation scheme /Industrial plants. and the same shall be certified by ordering agency. iv) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project. Note: 1.'Similar item' is defined as steel plates of thickness 16mm or higher and minimum 50 % of Overall weight of steel plates to be used in Turbine and Generator component of all units of said plant. 2.The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
2.0	**DIGITAL GOVERNING SYSTEM AND ACCESSORIES**			
2.1	DIGITAL GOVERNORING SYSTEM			The Sub-contractor/vendor: i) Should have designed, manufactured, and supplied similar items during the last Twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment/system manufactured for

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				similar item should have been successfully in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations/ Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units or at minimum one (1) Installation of at least four units. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project. Note: 'Similar item' is defined as digital governing system manufactured for 'minimum 50% of rating of unit capacity of hydro turbine generator set / Pump Storage' or 'Lift irrigation scheme having pump of Francis type of at least 50% of rated capacity' with minimum operating pressure range of 100-160 bar.
2.2 2.3	PRESSURE ACCUMULATOR TANK GOVERNOR ACTUATOR FOR GUIDE VANE			The Sub-contractor/vendor: i) Should have designed, manufactured, and supplied similar items during the last Twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The items designed & manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations/ Pump Storage Plants,

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project. Note: 1. 'Similar items' is defined as minimum 50% of the volume of unit capacity (having minimum operating pressure range of 100-160 bar) of hydro turbine generator set / Pump Storage / Lift irrigation scheme. 2. The certificate shall be issued by the OEM

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				complying with material compositions, grade and specifications as per TS.
2.4	HYDRAULIC OVERSPEED VALVE			The Sub-contractor/vendor: i) Should have designed, manufactured, and supplied similar items during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The items designed & manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations/ Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
2.5	SERVO / PROPORTIONAL VALVES			Note: i) 'Similar items' is defined as minimum 50% of the size (i.e. Flow rate) of relevant item/component (having minimum operating pressure range of 100-160 bar) for unit capacity of hydro turbine generator set / Pump Storage. ii) The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
2.6	OIL PUMPS			The Sub-contractor/vendor: i. Should have designed, manufactured and supplied oil pumps of at least 50% of required pumping capacity as per relevant IEEE having operating pressure range of 100-160 bar or above during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items designed & manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations/ Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. Or If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift Irrigation Scheme each

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift Irrigation Scheme of at least four units and the same shall be certified by ordering agency. iii. Should be an ISO certified company In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) /component(s) required for the project.
3.0	**MAIN INLET VALVE AND ACCESSORIES**			
3.1	**MAIN INLET VALVE (Fabrication & Manufacturing of Main Inlet Valve)**			**AS PER PQ CRITERIA**
3.2	BY-PASS VALVE AND AIR RELEASE VALVE			The Sub-contractor/vendor: i. Should have manufactured / supplied similar items during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The equipment manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations, **each comprising** at least two units or at minimum one (1) Hydro Power Station of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage each comprising at least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least four units and the same shall be certified by ordering agency.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project. If any of the items mentioned at Sl. No. 3.2 to 3.6 is/are manufactured by main contractor/JV partner does not require any specific approval and hence no document shall be required. Similarly, If a manufacturer (meeting the qualifying requirement as per bid condition) has been associated at bidding stage, the said manufacturer does not require any specific approval & hence no documentary evidence shall be required to furnish against relevant item(s). Note: 'Similar item' is defined as relevant item or component of hydro turbine generator set of minimum 50% of rated capacity and minimum 50% of rated head.
3.3	SERVOMOTOR			The Sub-contractor/vendor: i. Should have designed & manufactured, supplied MIV double acting servomotor at least 50% of required servomotor capacity (Stoke & Diameter) as per relevant IEEE and operating pressure range of 100-160 bar and above (considering two servomotors for MIV) during the last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The MIV double acting servomotor designed, manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations, each comprising at least two units or at minimum one (1) Hydro

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				Power Station of at least four units. **or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage each comprising at least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least four units and the same shall be certified by ordering agency. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design and manufacture or supply the item(s) / component(s) required for the project. Note: The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
3.4	PRESSURE ACCUMULATOR TANK			The Sub-contractor/vendor: i) Should have manufactured & supplied similar items earlier during last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage / Lift Irrigation Scheme each comprising at least two units or at minimum one(1) Hydro Power Station / Pump Storage / Lift Irrigation Scheme of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) / component(s) required for the project. Note: 'Similar items' is defined as minimum 50% of the volume of unit capacity (having minimum operating pressure range of 100-160 bar) of hydro turbine generator set / Pump Storage/Lift Irrigation Scheme.
3.5	OIL PUMPS			The Sub-contractor/vendor: i. Should have designed & manufactured/ supplied oil pumps of at least 50% of required pumping capacity having operating pressure range of 100-160 bar or above during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				inclusion. ii. The items manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least four units in operation. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage / Lift Irrigation Scheme each comprising at least two units or at minimum one(1) Hydro Power Station / Pump Storage / Lift Irrigation Scheme of at least four units and the same shall be certified by ordering agency. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design and manufacture or supply the item(s)/component(s) required for the project.
3.6	SELF LUBRICATING BUSHES			The Sub-contractor/vendor: i) Should have designed & manufactured /supplied similar item of MIV during the last

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The Similar item designed & manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least four units. **or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage each comprising at least two units or at minimum one(1) Hydro Power Station / Pump Storage of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design and manufacture or supply the item(s)/component(s) required for the project. Note: 1. 'Similar item' is defined as relevant item or component of "hydro turbine generator set of minimum 50% of rated capacity" of hydro turbine generator set / Pump Storage. 2. The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
4.0	**GENERATOR**			
4.1	**Fabrication & Manufacturing of Major Parts**			
4.1.1	STATOR FRAME AND SOLE PLATES			The Sub-contractor/vendor: i. Should have manufactured/executed *similar items/works* earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The equipment manufactured by the subcontractor/sub-vendor for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity & 50% of rated head may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift Irrigation Scheme, each comprising at least two units Or at minimum one (1) Hydro Power Station/ Pump Storage Plant / Lift Irrigation of at least four units and the same shall be certified by ordering agency in case of fabrication,
4.1.2	STATOR CORE (ELECTRICAL SHEET STEEL)			
4.1.3	STATOR BARS			
4.1.4	ROTOR SPIDER			
4.1.5	ROTOR RIM SHEETS (PUNCHING)			
4.1.6	GENERATOR SHAFT(S)			
4.1.7	UPPER AND LOWER BRACKET			
4.1.8	GUIDE/THRUST BEARING			
4.1.9	THRUST BEARING OIL COOLERS			
4.1.10	GUIDE BEARING OIL COOLERS			
4.1.11	STATOR AIR COOLERS			
4.1.12	HS LUBRICATION SYSTEM			
4.1.13	BRAKE DUST COLLECTOR			
4.1.14	CARBON DUST COLLECTOR			
4.1.15	BRAKE/JACK SYSTEM			
4.1.16	BEARING OIL (FOR TURBINE & GENERATOR)			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				forging & casting firms. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to manufacture the item(s)/component(s) required for the project. If any of the items mentioned at Sl. No. 4.1.1 to 4.1.16 is/are manufactured by main contractor/JV partner does not require any specific approval and hence no document shall be required. Similarly, If a manufacturer (meeting the qualifying requirement as per bid condition) has been associated at bidding stage, the said manufacturer does not require any specific approval & hence no documentary evidence shall be required to furnish against relevant item(s). Note: 1. 'Similar item/equipment' is defined as relevant item/component of hydro turbine generator set / Pump Storage / Lift Irrigation Scheme of minimum 50% of rated capacity and minimum 50% of rated head. 2. The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
4.2	**INSTRUMENTS AND DEVICES common for Turbine, Generator, MIV and Governor**			
4.2.1	VIBRATION MONITORING SYSTEM			The Sub-contractor/vendor: i. Should have designed, manufactured/ supplied and commissioned items/ equipment for hydro generating unit having capacity of minimum 50% of rated capacity earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items/equipment manufactured by the
4.2.2	AIR GAP MONITORING SYSTEM			
4.2.3	PARTIAL DISCHARGE MONITOR SYSTEM			
4.2.4	SHAFT CURRENT MONITORS			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
4.2.5	FIRE PROTECTION EQUIPMENT			subcontractor/sub-vendor should have been in satisfactory operation for at least two years at minimum two (2) Power Stations, each comprising at least two units or at minimum one (1) Power Station of at least four units. Or If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Power Stations each comprising at least two units or at minimum one (1) Power Station of at least four units and the same shall be certified by ordering agency. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to design and manufacture or supply the item(s)/component(s) required for the project. Note: The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
4.2.6	ELECTRICAL BRAZING DEVICE / EQUIPMENT			
4.2.7	MERCURY / GAS IN STEEL THERMOMETERS (DTT)			The Sub-contractor/vendor: i. Should have manufactured, type test / performance test & supplied equipment/ items earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage, each comprising at
4.2.8	PRESSURE SWITCH			
4.2.9	FLOW RELAY, FLOW METER, FLOW SWITCH AND LEVEL SWITCH			
4.2.10	PRESSURE TRANSMITTERS			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
4.2.11	THERMOSTATS			least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift Irrigation Scheme, each comprising at least two units Or at minimum one (1) Hydro Power Station/ Pump Storage Plant / Lift Irrigation of at least four units and the same shall be certified by ordering agency. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) / component(s) required for the project.
4.2.12	RTD			
4.2.13	MOISTURE DETECTOR			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
5.0	**DIGITAL STATIC EXCITATION SYSTEM**			The Sub-contractor/vendor: i. Should have designed, manufactured and supplied similar static excitation system earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations, each comprising at least two units or at minimum one (1) Hydro Power Station of at least four units. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: 'Similar static excitation system' is defined as used in relevant item/component of hydro generator of minimum 50% of rated capacity and generating voltage minimum of 11kV.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
5.1	DRY TYPE EXCITATION TRANSFORMER			The Sub-contractor/vendor: i. Should have designed, manufactured, type tested and supplied *similar equipment* earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The equipment manufactured .for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations, each comprising at least two units or at minimum one (1) Hydro Power Station of at least four units. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: Similar Item is defined as used in relevant item/ component of hydro generator of minimum 50% of rated capacity.
6.0	**GENERATOR CIRCUIT BREAKER**			The Sub-contractor/vendor: i) Should have designed, manufactured, type tested, supplied, installed, tested & commissioned of minimum 50% of rated current capacity and minimum 50% of rated Voltage of 3-Phase Generator Circuit Breaker (GCB) in last Twenty (20) years, ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. The above GCB so manufactured should have been in satisfactory operation* for at least two years from the date of commissioning at minimum two(2) Power Stations, each comprising at least two units or at minimum one(1) Power Station of at least four units. **Satisfactory operation means certificate*

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				issued by the Employer/Owner/Purchaser certifying the satisfactory operation. **OR** The manufacturers in India which are subsidiaries of any Indian/Foreign company can be qualified on the basis of experience of Parent/Holding company if the Parent/Holding Company meets the experience as stipulated above subject to Parent/Holding Company confirming full support for technical and financial requirements of the subsidiary company and commits to take up the work itself in case of non-performance by the subsidiary company. An additional performance guarantee for an amount of 3% of the cost of the system in the contract shall also be furnished. Note: • The type test report should be valid as per Central Electrical Authority's guidelines as on last day of the month previous to the one in which Contractor proposes / applies for addition / inclusion ii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
7.0	**BUS DUCT**			The Sub-contractor/vendor: i. Should have designed, manufactured, type tested, supplied and commissioned 11 kV or above, bus duct having current rating of minimum 50% of rated bus duct current earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The equipment manufactured should have been in satisfactory operation for at least two

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				years at minimum two (2) Hydro Power Stations, each comprising at least two units or at minimum one (1) Hydro Power Station of at least four units. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
7.1	CT's & PT's			The Sub-contractor/vendor: i. Should have designed, manufactured, type tested and supplied *similar Item* earlier during the last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The equipment manufactured by the subcontractor/sub-vendor for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations, each comprising at least two units or at minimum one (1) Hydro Power Station of at least four units. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: Similar equipment is defined as those used in relevant item/component of 11 KV or above, bus duct having current rating of minimum 50% of rated bus duct current.
7.2	NEUTRAL GROUNDING TRANSFORMER			
7.3	LIGHTENING / SURGE ARRESTOR			
7.4	INSULATORS/ BUSHINGS			
7.5	SURGE CAPACITOR			
8.0	**TRANSFORMERS**			
8.1	GSU			The Sub-contractor/vendor:

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
	TRANSFORMERS			i) Should have designed, manufactured, type tested, supplied, installed, tested & commissioned of rated voltage class & above and minimum 50% of rated capacity, Transformers in last twenty (20) years, ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. The above transformers so manufactured should have been in satisfactory operation* for at least two years from the date of commissioning at minimum two (2) Power Stations, each comprising at least two generating units or at minimum one (1) Power Station of at least four generating units. **Satisfactory operation means certificate issued by the Employer/Owner/Purchaser certifying the satisfactory operation.* **OR** The manufacturers in India which are subsidiaries of any Indian/Foreign company can be qualified on the basis of experience of Parent/Holding company if the Parent/Holding Company meets the experience as stipulated above subject to Parent/Holding Company confirming full support for technical and financial requirements of the subsidiary company and commits to take up the work itself in case of non-performance by the subsidiary company. An additional performance guarantee for an amount of 3% of the cost of the system in the contract shall also be furnished. Note: • The type test report should be valid as per Central Electrical Authority's guidelines as on last day of the month previous to the one in which Contractor proposes / applies for addition / inclusion iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
8.2	OIL PUMPS			The Sub-contractor/vendor: i. Should have designed, manufactured, and supplied similar items during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items designed & manufactured should have been in satisfactory operation for at least two years at minimum two power stations/sub-stations. iii. Should be an ISO certified company In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: 'Similar item' is defined as transformer having capacity of minimum 50% of rated GSU transformer capacity of rated KV class or above.
8.3	DOUBLE WALLED OIL COOLERS			
8.4	HV BUSHING			
8.5	TRANSFORMER OIL			
8.6	MOISTURE DETECTOR (WATER IN OIL DETECTOR)			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
8.7	TRANSFORMER OIL DGA TEST SET			The Sub-contractor/vendor: i. Should have designed, manufactured, supplied & commissioned similar items during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items should have been in satisfactory operation for at least two years at minimum two power stations/sub-stations. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
9.0	**REACTOR**			
9.1	REACTOR			The Sub-contractor/vendor: i) Should have designed, manufactured, type tested, supplied, installed, tested & commissioned of minimum 50% of rated capacity of 400 KV class or **above 1-phase Reactor (if 1-phase reactor is in the scope of work other wise 3-Phase Reactor as per scope of work)** in last twenty (20) years, ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. The above Reactor so manufactured should have been in satisfactory operation* at least at two power stations/sub-stations for a period of minimum two (02) years from the date of commissioning. **Satisfactory operation means certificate issued by the Employer/Owner/Purchaser certifying the satisfactory operation.* **OR** The manufacturers in India which are

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				subsidiaries of any Indian/Foreign company can be qualified on the basis of experience of Parent/Holding company if the Parent/Holding Company meets the experience as stipulated above subject to Parent/Holding Company confirming full support for technical and financial requirements of the subsidiary company and commits to take up the work itself in case of non-performance by the subsidiary company. An additional performance guarantee for an amount of 3% of the cost of the system in the contract shall also be furnished. Note: The type test report should be valid as per Central Electrical Authority's guidelines as on last day of the month previous to the one in which Contractor proposes / applies for addition / inclusion. ii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) / component(s) required for the project.
9.2	OIL PUMPS			The Sub-contractor/vendor: i. Should have designed, manufactured, and supplied similar items during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items designed & manufactured should have been in satisfactory operation for at least two years at minimum two power stations/sub-stations. iii. Should be an ISO certified company In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be
9.3	DOUBLE WALLED OIL COOLERS			
9.4	HV BUSHING			
9.5	TRANSFORMER OIL			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
9.6	MOISTURE DETECTOR (WATER IN OIL DETECTOR)			submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: 'Similar item' is defined as transformer having capacity of minimum 50% of rated GSU transformer capacity of rated KV class or above.
10.0	**GAS INSULATED SWITCHGEAR**			
10.1	GAS INSULATED SWITCHGEAR			The Sub-contractor/vendor: i) Should have successful experience in designing, manufacturing, type test, supply, installation, testing & commissioning of at least two (2) nos. bays* of GIS having rated voltage or higher with current rating of minimum 50% of rated GIS bus bar current and Short circuit current rating of 50 kA or above during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for addition / inclusion. ii) The GIS so designed & manufactured should have been in satisfactory operation for at least two years at minimum two power stations/sub-stations. OR The manufacturer in India which has either supplied at least One (1) no. 380kV or higher with current rating of minimum 50% of rated GIS bus bar current and short circuit current rating of 50kA or above GIS bay* or type tested the same and which is subsidiary/group company or having collaboration with any Indian / Foreign company can be qualified on the basis of experience of Parent/Holding/Collaborating company if the Parent/Holding/ Collaborating company meets the experience as stipulated above and confirms full support for technical and financial requirements and commits to take up the work itself in case of non-performance by the subject manufacturer in India. An additional performance guarantee for an amount of 3% of the cost of the GIS package in the contract shall also be furnished by the Parent/Holding/Collaborating

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				company. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: • (#)Satisfactory operation means certificate issued by the Employer certifying the operation without any adverse remark. • (*) One no. GIS Bay shall be considered as a bay used for controlling a line or a generator / transformer or a reactor and comprising of at least one circuit breaker, one Disconnector, CTs, earthing switch and Surge Arrester.
11.0	**OUTDOOR POTYARD EQUIPMENT**			
11.1	CAPACITIVE VOLTAGE TRANSFORMER			the Sub-contractor/vendor shall have to meet the following criteria: I. Should have designed, manufactured, type tested (not for substation structure) and supplied equipment for rated voltage or higher voltage level earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. II. The equipment supplied should have been in satisfactory operation for at least two years at minimum two power stations/substations of rated voltage class or above. III. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the
11.2	STRUCTURE, INSULATORS AND CLAMP CONNECTOR HARDWARE			
11.3	LINE/WAVE TRAP			
11.4	L. A./ SURGE ARRESTER			
11.5	CONDUCTOR			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				item(s)/component(s) required for the project.
12.0	**DC SYSTEMS (220V AND 48V, UPS & INVERTER)**			The Sub-contractor/vendor/integrator: i) Should have designed, supplied and commissioned DC System of similar size* of battery capacity and associated battery chargers & DCDB earlier during the last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so supplied by the subcontractor/sub-vendor for similar item should have been in satisfactory operation for at least two years at minimum two power stations/sub-stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply & commission the item(s)/ component(s) required for the project. Note: Similar size* is defined as (i) Plante type battery bank of min.50% of rated capacity OR Ni-Cd (FNC) type /Pocket plate high discharge type (KOH) battery bank of min.50% of rated capacity (ii) 50% or above of design capacity of relevant equipment i.e. Battery charger (float cum boost charging), DCDB and Inverter.
12.1	BATTERY BANK			The Sub-contractor/vendor: i) Should have designed, manufactured,

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
12.2	BATTERY CHARGERS			supplied and type tested **similar size*** of equipments during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so supplied by the subcontractor/sub-vendor should have been in satisfactory operation for at least two years at minimum two power stations/sub stations of **132 kV class** or above. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: A. Similar size* is defined for Battery Bank as under: *Plante type battery bank of min. 50% of rated capacity* *OR* Ni-Cd (FNC) type battery bank of min. 50% of rated capacity / Pocket plate high discharge type (KOH) battery bank of min.50% of rated capacity B. Similar size* is defined for Battery Charger as under: *50% or above of design capacity of relevant equipment i.e. Battery charger (float cum boost charging), DCDB, UPS and Inverter.*
13.0	**CONTROL AND MONITORING SYSTEM**			
13.1	CONTROL AND MONITORING SYSTEM			The Sub-contractor/vendor: i) Should have successful experience in designing, manufacturing, supply, installation, testing & commissioning of Control, Protection and Monitoring Systems

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				comprising integrated Computerized Control System for minimum **three units** or more in a power plant having capacity above 25MW in last twenty (20) years, ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The system so supplied by the subcontractor/sub-vendor should have been in satisfactory operation for at least two years at minimum two power stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
13.2	PANELS/CUBICLES/ CONTROL BOARDS			The Sub-contractor/vendor: i) Should have manufactured, supplied and type tested similar items/equipment earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so supplied by the subcontractor/sub-vendor should have been in satisfactory operation for at least two years at minimum two power stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
13.3	LED DISPLAY			
13.4	HMI, PLC's, OPERATOR WORKSTATIONS			
13.5	SERVERS/ NETWORK COMPONENTS			
13.6	PCs/LAPTOPS & OTHER ACCESSORIES			
14.0	**PROTECTION SYSTEM**			
14.1	PROTECTION SYSTEM			The Sub-contractor/vendor: i) Should have successful experience in

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				designing, manufacturing, supply, installation, testing & commissioning of Protection Systems comprising Numerical Protection System for minimum three units or more in a power plant having capacity above 25MW in last twenty (20) years, ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The system so supplied by the subcontractor/sub-vendor should have been in satisfactory operation for at least two years at minimum two power stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
14.2	PANELS/CUBICLES			The Sub-contractor/vendor: i) Should have manufactured, supplied and type tested similar items/equipment earlier during the last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The items/equipment so supplied by the subcontractor/sub-vendor for similar item should have been in satisfactory operation for at least two years at minimum two power stations/Substation. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
14.3	MAIN PROTECTION RELAYS			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				Note: Similar items/equipment is defined as used in relevant item/equipment of protection systems comprising numerical protection system in a power plant having capacity of 25 MW or above / Substation (110 kV & above).
14.4	STATIC / ELECTRO-MECHANICAL PROTECTION / AUXILIARY / TRIPPNG RELAYS			The Sub-contractor/vendor: i) Should have manufactured, type tested, supplied similar items* earlier during last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The items so supplied by the subcontractor/sub-vendor for similar items should have been in satisfactory operation for at least two years at minimum two power stations/Substation. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note*: Similar items/equipment is defined as used in relevant item/equipment of protection systems comprising numerical protection system in a power plant having capacity of 25 MW or above / Substation (110 kV & above).
14.5	AUX. CT & PT			
15.0	**CABLING SYSTEM**			The Sub-contractor/vendor: i) Should have designed, supplied and commissioned at least 1000 KM of cabling system consisting of control, LT and 11KV power cables in power station/ switchyard of 110 kV class or above earlier during last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The system supplied (irrespective of length) by the subcontractor/sub-vendor should have been in satisfactory operation for at least two years at minimum two power

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				stations/sub-stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply and commission the item(s)/component(s) required for the project.
15.1	11kV XLPE CABLES			The Sub-contractor/vendor: i) Should have manufactured, type tested and supplied 100kms or above (all sizes inclusive) of 11KV XLPE cables earlier during last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The cables manufactured should have been in satisfactory operation (irrespective of length) for at least two years at minimum two power stations/sub-stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
15.2	LT POWER CABLES			The Sub-contractor/vendor: i) Should have manufactured, type tested and supplied 500 kms or above with at least one single order of 50 km or above (all sizes inclusive) of LT power cables earlier during last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The item so manufactured should have been in satisfactory operation (irrespective of length)for at least two years at minimum two power stations/sub-stations.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
15.3	CONTROL CABLES AND INSTRUMENTATION CABLES			The Sub-contractor/vendor: i) Should have manufactured, type tested and supplied 500kms or above with at least one single order of 50 km or above (all sizes inclusive) of control and instrumentation cables earlier during last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The item so manufactured should have been in satisfactory operation (irrespective of length) for at least two years at minimum two power stations/sub-stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
15.4	CABLE TRAYS, RACKS INCLUDING ACCESSORIES			The Sub-contractor/vendor: i) Should have manufactured, type tested and supplied 100kms or above Cable trays with at least one single order of 5km or above earlier during the last twenty(20)years, ending last day of the month previous to the one in which Contractor proposes / applies for addition / inclusion, at minimum two power stations. ii) The item so manufactured (irrespective of length) should have been in satisfactory

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				operation for at least two years at minimum two power stations/sub-stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
16.0	**MV SWITCHGEAR**			The Sub-contractor/vendor**:** i) Should be OEM/ Approved OEM vendor and have designed, Type tested, supplied and commissioned switchgear system having minimum 11kV voltage with short circuit rating of 25 kA or above and having current rating of minimum 50% of rated bus bar current earlier during the last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so supplied should be satisfactory in operation for at least two years at minimum two Power stations/ sub-stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply and commission the item(s)/component(s) required for the project.
16.1	11 KV CB			The Sub-contractor/vendor: i) Should have designed, manufactured, type tested and supplied 11KV CB with short circuit rating of 25kA or above and having minimum 50% of rated current earlier during the last twenty (20)years ending last day of the month previous to the one in which

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been successfully commissioned/ in operation for at least two years at minimum two (2) Power stations/ sub-stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project.
16.2	CT & PT			The Sub-contractor/vendor: i) Should have manufactured, type tested, supplied items earlier during last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The items so manufactured should have been in successful operation for at least two years at minimum three Power station/ Substation. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
17.0	**DG SETS**			
17.1	**DG SETS – SYSTEM INTEGRATOR**			The Sub-contractor/vendor/integrator: i) Should have designed, supplied and commissioned DG sets having rated voltage and minimum of 50% of rated capacity earlier during the last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				for inclusion. ii) The DG set so supplied should have been in satisfactory operation at least at two years at minimum two (2) industrial installations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply and commission the item(s)/component(s) required for the project.
17.2	ENGINE			The Sub-contractor/vendor: i) Should have manufactured, performance/type tested and supplied relevant equipment compatible to minimum 50% of rated output of alternator earlier during last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in satisfactory operation at least at two years at minimum two industrial installations. iv) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
17.3	ALTERNATOR			
18.0	**415V SWITCHGEAR AND AUXILIARY TRANSFORMERS**			
18.1	415V SWITCHGEAR PANEL/UAB/ SSB			The Sub-contractor/vendor: i) Should have designed, supplied, type tested and commissioned 415V LT switch gear system with short circuit rating of 50kA or above and having current rating of minimum 50% of rated bus bar current earlier during last twenty (20)years ending last day of the

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so supplied should have been in satisfactory operation for at least two years at minimum two power stations/ substations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply & commission the item(s)/component(s) required for the project.
18.2	LV BUS DUCT			The Sub-contractor/vendor: i) Should have manufactured, type tested, supplied and commissioned relevant items / equipment earlier during last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in satisfactory operation for at least two years at minimum two (2) power stations/ substations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to supply the item(s)/component(s) required for the project.
18.3	CT/PT			The Sub-contractor/vendor: i) Should have manufactured, type tested, supplied items earlier during last twenty (20)years ending last day of the month

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
18.4	NUMERICAL/PROTECTION / AUXILIARY RELAYS			previous to the one in which Contractor proposes / applies for inclusion. ii) The items so manufactured should have been in satisfactory operation at least two years at minimum two Power stations/ Sub-stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturer capability and financial resources to manufacture the item(s)/component(s) required for the project.
18.5	OIL TYPE TRANSFORMER			The Sub-contractor/vendor: i) Should have designed, manufactured, type tested 'Similar transformer*' at 11 KV class or above earlier during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The transformer so manufactured should have been in satisfactory operation at least two years at minimum two (2) power stations/ sub-stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
18.5 18.6	OIL TYPE TRANSFORMER DRY TYPE TRANSFORMER			The Sub-contractor/vendor: iv) Should have designed, manufactured, type tested 'Similar transformer*' at 11 KV class or above earlier during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. v) The transformer so manufactured should have been in satisfactory operation at least two years at minimum two (2) power stations/ sub-stations. vi) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: Similar Transformer* is defined as below for relevant transformers: (i) For Dry Type Transformer: 11KV/415V Dry type Transformer having capacity of min. 500KVA. (ii) For Oil Type Transformer: 11KV/415V Oil type Transformer having capacity of min. 500 KVA
19.0	**ILLUMINATION SYSTEM**			
19.1	ILLUMINATION SYSTEM INTEGRATOR			The Sub-contractor/vendor: i) Should have designed, supplied and commissioned illumination system for power station having capacity of 25MW or above earlier during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				ii) The system so supplied should have been in satisfactory operation at least two years at minimum at two (2) power stations/ industrial installations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply & commission the item(s)/component(s) required for the project.
19.2	LUMINAIRES / FITTINGS MODULAR SWITCHES / SOCKETS UPS / INVERTER			The Sub-contractor/vendor: i) Should have manufactured, type tested, supplied items earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The items so manufactured should have been in satisfactory operation at least two years at minimum two (2) industrial installations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
20.0	**COMMUNICATION SYSTEM**			
20.1	PUBLIC ADDRESS SYSTEM INTEGRATOR			The Sub-contractor/vendor/Integrator: i) Should have designed, supplied and commissioned Public address system for hydro power station having capacity of 25 MW or above/ Industrial Installations during the last twenty(20)years ending last day of the month previous to the one in which

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				Contractor proposes / applies for inclusion. The equipment so supplied should have in satisfactory operation for at least two years at minimum two power stations/industrial installations. ii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply and commission the item(s)/component(s) required for the project.
20.2	PUBLIC ADDRESS SYSTEM			The Sub-contractor/vendor: i) Should have manufactured, type tested and supplied Public address system for hydro power station having capacity of 25 MW or above / Industrial Installations during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have in satisfactory operation for at least two years at minimum two power stations/ Industrial Installations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
20.3	EPABX			The Sub-contractor/vendor: i) Should have manufactured, type tested and supplied *similar items/ equipment earlier during last twenty (20)years ending last day
20.4	CONFERENCING SYSTEM			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in successful for at least two years at minimum two power stations/ Industrial Installations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: '*Similar items/equipment' is defined as used in relevant item/equipment of communication systems in a Power plant having capacity of 25 MW or above.
21.0	**ELECTRICAL WORKSHOP**			
	MOISTURE MEASUREMENT KIT			The Sub-contractor/vendor: i) Should have manufactured, supplied and commissioned relevant *similar items / equipments earlier during the last twenty (20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The items/equipment should have been in satisfactory operation for at least two years at minimum two (2) Power stations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: '*Similar items/equipment' is defined as used in relevant item/equipment of Electrical
	RESISTIVITY MEASUREMENT KIT			
	TRANSFORMER OIL DIELECTRIC TESTER			
	AC/DC INSULATION TESTERS			
	AC/DC MULTIMETERS			
	AC HV TEST KIT			
	PRIMARY CURRENT INJECTION SET			
	UNIVERSAL RELAY TESTING KIT			
	TRANSFORMER WINDING RESISTANCE MEASUREMENT KIT			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
	TURNS RATIO TESTER			workshop of Power stations.
	DC RECTIFORMER RECTIFIRE ASSEMBLY			
	AUTOMATIC CAPACITANCE AND TAN DELTA KIT			
	SILT MEASURING EQUIPMENT			
	TOROIDAL TRANSFORMERS			
	PORATABLE MULTI CHANNEL VIBRATION METER			
	PORTABLE EARTH RESISTANCE MEASUREMENT DEVICE			
	STROBOSCOPE			
	CRO			
	MICRO OHM METER			
	DC EARTH FAULT LOCATOR			
	DEW POINT METER			
	CIRCUIT BREAKER TIMING MEASUREMENT ANALYSER			
22.0	**ELECTRIC OVERHEAD TRAVELLING (EOT) CRANES**			
22.1	EOT CRANE			The Sub-contractor/vendor: i) Should have designed, manufactured and supplied similar EOT crane during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The EOT crane should have been in satisfactory operation for at least two years at minimum two Power Stations / industrial installations. iii) Should be an ISO certified company.
	VVVF DRIVE			
	WIRE ROPES			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: '*Similar EOT Crane' is defined as EOT crane having capacity of 50% & span of 75% of required crane capacity or higher.
22.2	MOTORS			The Sub-contractor/vendor: i) Should have designed, manufactured, type tested and supplied *similar items/ equipment earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in satisfactory operation for at least two years at minimum two power stations / industrial installation. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: '*Similar items/equipment' is defined as used in relevant item/equipment of required EOT crane having capacity of 50% & span of 75% of required crane capacity or higher.
23.0	**COOLING WATER SYSTEM INTEGRATOR**			The Sub-contractor/vendor: i) Should have designed, supplied and commissioned cooling water system for underground power station having capacity of 25MW or above earlier during the last twenty(20)years ending last day of the month previous to the one in which Contractor

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				proposes / applies for inclusion. ii) The system so supplied should have been in successful operation for at least two years at minimum two hydro power stations / Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply and commission the item(s)/component(s) required for the project.
23.1	PUMPS			The Sub-contractor/vendor: i) Should have manufactured, type tested / performance tested and supplied horizontal centrifugal pump having 50% or above of design capacity earlier during last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The pump so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. **Or** Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. iii) Should be an ISO certified company. In support of above, documentary evidence duly

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
23.2	AUTOMATIC BACKWASH DUPLEX STRAINER			The Sub-contractor/vendor: i) Should have manufactured, type tested and supplied automatic backwash duplex wedge wire type strainer having 50% or above of design capacity with filtration size (up to 600 micron for primary and up to 100 micron for secondary system) earlier during last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The pump so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each comprising at least two units or at minimum

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
23.3	FLOW RELAY/ FLOW METER / FLOW SWITCH/ LEVEL SWITCH			The Sub-contractor/vendor: i. Should have manufactured, type test / performance test & supplied equipment/ items earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or**

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift Irrigation Scheme, each comprising at least two units Or at minimum one (1) Hydro Power Station/ Pump Storage Plant / Lift Irrigation of at least four units and the same shall be certified by ordering agency. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) / component(s) required for the project.
23.4	CYCLONE SEPERATORS			The Sub-contractor/vendor: i) Should have manufactured, type tested and supplied cyclone separator: For Primary cooling water circuit: Single stage, 75 micron having 50% or better of design capacity, earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The item so manufactured should have been in satisfactory operation for at least two years at minimum two hydro power stations/ Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
23.5	AUTOMATIC SELF-CLEANING SIMPLEX / DUPLEX FILTER (SHAFT SEAL)			The Sub-contractor/vendor: i) Should have manufactured, type tested and supplied automatic self-cleaning simplex / duplex wedge wire type filter having 50% or above of design capacity with filtration size of 50 micron or better earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The item so manufactured should have been in satisfactory operation for at least two years at minimum two hydro power stations /

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
23.6	HEAT EXCHANGERS			The Sub-contractor/vendor: i) Should have manufactured, type tested / performance tested and supplied heat

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				exchangers earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The item so manufactured should have been in satisfactory operation for at least two years at minimum two hydro power stations / Thermal / Oil / Gas/industrial applications. Similar item is defined as wide plate type heat exchanger of similar specifications with 50 % of rated flow capacity. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) / component(s) required for the project.
24.0	**DRAINAGE AND DEWATERING SYSTEM INTEGRATOR**			The Sub-contractor/vendor/Integrator: i) Should have designed, supplied and commissioned drainage and dewatering system for underground power station having capacity of 25MW or above during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The system so supplied should have been in satisfactory operation for at least two years at minimum two hydro power stations / Pump Storage. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply & commission the item(s)/component(s) required for the project.
24.1	SUBMERSIBLE PUMPS			The Sub-contractor/vendor:

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				i) Should have manufactured, type tested / performance tested and supplied submersible pump having capacity of 50% or above of pump's design discharge at 50% of design head or above, earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in successful operation for at least two years at minimum two hydro power stations / Pump Storage. **Or** Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
24.2	FLOW RELAY/ FLOW METER / FLOW SWITCH/ LEVEL SWITCH			The Sub-contractor/vendor: i. Should have manufactured, type test / performance test & supplied equipment/ items earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift Irrigation Scheme, each comprising at least two units Or at minimum one (1) Hydro Power Station/ Pump Storage Plant / Lift Irrigation of at least four units and the same shall be certified by ordering agency. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) / component(s) required for the project.
25.0	**HEATING, VENTILATION AND AIR CONDITIONING (HVAC) SYSTEM**			
25.1	HVAC SYSTEM INTEGRATOR			The Sub-contractor/vendor/Integrator: i) Should have designed, supplied and commissioned HVAC system for underground power station having capacity of 25MW or above /aviation/underground metro stations earlier during the last twenty(20)years ending last day of the month

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				previous to the one in which Contractor proposes / applies for inclusion. ii) The system so supplied should have been in satisfactory operation for at least two years at minimum two hydro power stations/ aviation/underground metro stations iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply & commission the item(s)/component(s) required for the project.
25.2	AHU			The Sub-contractor/vendor: i) Should have manufactured and supplied items / equipment earlier during last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the
	PACKAGED AC (WATER COOLED/AIR COOLED)			
	PUMPS			
	AUTOMATIC SELF-CLEANING FILTER			
	CYCLONE SEPARATOR			
	FANS/BLOWERS			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				item(s)/component(s) required for the project. Note The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
25.3	FLOW RELAY/ FLOW METER / FLOW SWITCH			The Sub-contractor/vendor: i. Should have manufactured, type test / performance test & supplied equipment/ items earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift Irrigation Scheme, each comprising at least two units Or at minimum one (1) Hydro Power Station/ Pump Storage Plant / Lift Irrigation of at least four units and the same shall be certified by ordering agency.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) / component(s) required for the project.
26.0	**COMPRESSED AIR SYSTEMS**			
26.1	COMPRESSOR			The Sub-contractor/vendor: i) Should have manufactured, type tested / performance test and supplied LP compressor of 7 bar or above earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
26.2	BLOW DOWN AIR COMPRESSOR			The Sub-contractor/vendor: i) Should have designed, manufactured, type tested / performance tested and supplied compressor suitable for synchronous condenser air working pressure or above earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Power stations / industrial installations. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
26.3	AIR DRYER			The Sub-contractor/vendor: i) Should have designed, manufactured, type / performance tested and supplied items/equipment earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in successful operation for at least two years at minimum two (2) power stations / industrial installations.

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				Or If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
27.0	**FIRE FIGHTING SYSTEM**			
27.1	FIRE FIGHTING SYSTEM INTEGRATOR			The Sub-contractor/vendor/Integrator: i) Should have designed, supplied and commissioned firefighting system of Transformer, Cables & other equipment consisting of high velocity water, medium velocity water, water sprinkler and fire hydrant system earlier during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The system so supplied should have been in satisfactory operation for at least two years at minimum two (2) hydro/thermal/nuclear power stations/ Oil & gas Industry. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply and commission the system

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				required for the project.
27.2	PUMP/MOTOR SET			These are important equipment for safety of plant and personnel. Contractor/vendor has to meet the following criteria and UL or equivalent Listed & NFPA/TAC recommended equipment shall only be accepted. The Sub-contractor/vendor: i) Should have manufactured, type/ performance tested and supplied of items/equipment earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/ component(s) required for the project.
	FIRE ALARM PANEL			
	DELUGE VALVE			
	HEAT/SMOKE DETECTORS & OTHER DETECTORS			
	OPTICAL/BEAM DETECTORS			
	LHS CABLE			
	ASPIRATOR TYPE SMOKE DETECTION SYSTEM			
	PORTABLE FIRE EXTINGUISHERS			
27.3	FLOW RELAY/ FLOW METER / FLOW SWITCH/ LEVEL SWITCH			The Sub-contractor/vendor: i. Should have manufactured, type test / performance test & supplied equipment/ items earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes /

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				applies for inclusion. ii. The items manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift Irrigation Scheme, each comprising at least two units Or at minimum one (1) Hydro Power Station/ Pump Storage Plant / Lift Irrigation of at least four units and the same shall be certified by ordering agency. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) / component(s) required for the project.
28.0	**OIL HANDLING SYSTEM**			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
28.1	LUBRICATING OIL FILTRATION PLANT			The Sub-contractor/vendor: i) Should have designed, manufactured, type / performance tested and supplied equipment/plant capacity of minimum 50% of insulating oil filtration plant or minimum 50% of lubricating oil filtration plant earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The oil filtration plants/ equipment so manufactured should have been in satisfactory operation for at least two years at minimum two power stations/ industrial installations. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
	INSULATING OIL FILTRATION PLANT			
28.2	PUMPS			The Sub-contractor/vendor: i) Should have designed, manufactured, type / performance tested and supplied of items/equipment earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Power
	VACUUM PUMPS			
	CENTRIFUGE			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				Stations / industrial installations. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
29.0	**MECHANICAL WORKSHOP**			
29.1	LATHE MACHINE			The Sub-contractor/vendor: i. Should have manufactured, supplied and items/equipment earlier during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items/equipment should have been in successful operation for at least two years at minimum two (2) power stations/industrial installations. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations and the same shall be certified by ordering agency.
	BATTERY OPERATED FORK LIFTER			
	BATTERY OPERATED HANDLING CARTS			
	WELDING MACHINES/ GENERATORS			
	RADIAL DRILLING MACHINE			
	STATIONARY DRILLING MACHINE			
	PIPE BENDING MACHINE			
	HYDRAULIC TORQUE TENSIONER			
	PRECISION INSTRUMENTS			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
	• VERNIER CALLIPER • DIAL GAUGE • HEIGHT GAUGE • STRAIGHT EDGE • SCREW GAUGE • MASTER LEVEL • OPTICAL LEVEL • DEPTH GAUGE • INSIDE AND OUTSIDE MICRO METER • SURFACE PLATE			iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: 'Similar items/equipment' is defined as used in relevant item/equipment of Mechanical workshop of Power stations/Industrial installations.
	GRINDING MACHINE			
	HYDRAULIC PLATFORM			
	ELECTRICAL HAND DRILLLING MCHINE			
	POTABLE MAGNETIC BASE ELECTRICAL DRILLING MACHINE			
	POWER HACKSAW			
30.0	**ELEVATOR**			
30.1	ELEVATOR			The Sub-contractor/vendor: i) Should have designed, manufactured, type / performance tested, supplied and commissioned Elevator having capacity minimum 10 persons earlier during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The elevator should have been in satisfactory operation for at least two years at minimum two power stations/industrial installations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient
30.2	WIRE ROPE			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project.
31.0	**SECURITY AND SERVEILLANCE SYSTEM**			
31.1	SECURITY AND SERVEILLANCE SYSTEM INTEGRATOR			The Sub-contractor/vendor: i) Should have designed, supplied and commissioned security & surveillance system for three power stations/ installations during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The system so supplied should have been in satisfactory operation for at least two years at minimum two power stations/ Industrial installations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to design, supply & commission the item(s)/component(s) required for the project.
31.2	ACCCES CONTROL SYSTEM AND CCTV SURVELLIANCE SYSTEM			The Sub-contractor/vendor: i) Should have manufactured, type tested, supplied *similar equipment earlier during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment should have been in satisfactory operation at least at two (2) power stations/ Industrial installations. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				technical & manufacturer capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: '*Similar equipment' is defined as used in relevant item/equipment of security & surveillance system for Power stations/Industrial installations.
32.0	**MISCELLANEOUS ITEMS**			
32.1	AUTOMATIC SELF-CLEANING SIMPLEX / DUPLEX FILTER			The Sub-contractor/vendor: i) Should have manufactured, type tested / performance tested and supplied automatic self-cleaning simplex / duplex wedge wire type filter having 50% or above of design capacity with filtration size of 600 micron or better earlier during last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The item so manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
32.2	CYCLONE SEPERATORS			The Sub-contractor/vendor: i) Should have manufactured, type tested and supplied cyclone separator: Single stage, 75 micron having 50% or better of design capacity, earlier during last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The item so manufactured should have been in satisfactory operation for at least two years at minimum two hydro power stations/ Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station/ Pump Storage Plant of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or**

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift irrigation scheme, each comprising at least two units or at minimum one(1) Hydro Power Station/ Pump Storage Plant / Lift irrigation scheme of at least four units and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s)/component(s) required for the project. Note The certificate shall be issued by the OEM complying with material compositions, grade and specifications as per TS.
32.3	MOTORS			The Sub-contractor/vendor: i) Should have manufactured, supplied and commissioned relevant *similar items/equipment earlier during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The items/equipment should have been in satisfactory operation for at least two years at minimum two (2) power station/ Industrial installations. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item
	CT & PT			
	NUMERICAL RELAY			
	STATIC / ELECTRO-MECHANICAL PROTECTION / AUXILIARY / TRIIPNG RELAYS			
	RTDS			
	CIRCUIT BREAKERS/ MCBs/ MCCBs			
32.4	PANELS/ CUBICLES/ CONTROL BOARDS			
	TERMINAL BLOCKS & ACCESSORIES,			

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
	SIDE CLAMPS			should have been in satisfactory operation for at least two years at minimum two (2) Power Stations / industrial installations and the same shall be certified by ordering agency. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturer capability and financial resources to manufacture the item(s)/component(s) required for the project. Note: '*Similar items/equipment' is defined as miscellaneous items/equipment used in Power stations/Industrial installations.
	STARTERS & CONTACTORS			
	TRIP CIRCUIT SUPERVISION RELAY			
	MOTOR PROTECTION CKT BREAKERS			
	VALVES – AIR TYPE			
	VALVES – OIL TYPE			
	VALVES – WATER TYPE			
	HEAD RACE AND TAIL RACE LEVEL SENSORS AND INDICATORS			
	PRESSURE GAUGE			
	PRESSURE SWITCH/ PRESSURE TRANSMITTER			
	LEVEL SWICTH/ INDICATOR/RADAR TYPE LEVEL SENSOR			
	HORIZONTAL CENTRIFUGAL PUMPS			
	TEMPERATURE SENSING DEVICES/DTT			
	THERMOSTATS			
32.5	FLOW RELAY/ FLOW METER / FLOW SWITCH/ LEVEL SWITCH			The Sub-contractor/vendor: i. Should have manufactured, type test / performance test & supplied equipment/ items earlier during the last twenty (20) years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii. The items manufactured should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				Stations / Pump Storage, each comprising at least two units or at minimum one (1) Hydro Power Station / Pump Storage of at least four units. Lift irrigation scheme having pump of Francis type with at least 50% of Unit capacity may be considered by the Employer based on merit of each case. The equipment manufactured for similar item should have been in satisfactory operation for minimum two years at above two (2) installations, each comprising at least two units Or at minimum one (1) Installation of at least four units. **Or** If the contractor (to whom LOA is placed by NHPC) is not the manufacturer, they should have successfully executed *similar works* i.e. the equipment manufactured for similar item should have been in satisfactory operation for at least two years at minimum two (2) Hydro Power Stations / Pump Storage Plants / Lift Irrigation Scheme, each comprising at least two units Or at minimum one (1) Hydro Power Station/ Pump Storage Plant / Lift Irrigation of at least four units and the same shall be certified by ordering agency. iii. Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical & manufacturing capability and financial resources to manufacture the item(s) / component(s) required for the project.
33.0	**LIST OF AGENCIES:**			
33.1	ERECTION / INSTALLATION SERVICES			The Sub-contractor/vendor: i) Should have erected / installed at least two hydro power plants having minimum three numbers vertical turbine generator units of

Sl. No.	Items of Facilities	Name of Sub-Contractors / Vendors	Country of origin of Goods	Specific Qualification Criteria
				capacity 25MW or above earlier during the last twenty(20)years ending last day of the month previous to the one in which Contractor proposes / applies for inclusion. ii) The equipment so erected should have been in satisfactory operation at least at two (2) Hydro Power stations, for minimum two (02) years. iii) Should be an ISO certified company. In support of above, documentary evidence duly certified by contractor along with the complete details of the company profile be furnished. Further, certification by contractor shall also be submitted that the vendor is having sufficient technical capability and financial resources to execute the work required for the project.

Note:

1. **Vendor/Sub-Contractor need to invariably comply with detailed technical specification covered in GTR, GTS, PTS and TDS.**

2. **Proposed Subcontractor/ vendor by the contractor shall adhere to 'Make in India policy' as defined in Public procurement (Preference to Make in India), Order 2017 or amendment thereof issued by Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce & Industry, G.O.I.**

3. **Vendor/Sub-Contractor proposed by the Contractor shall comply with the provision of "Restrictions under Rule 144 (xi) of the General financial Rule (GFRs) 2017" dated 23.07.2020 and subsequent amendment/clarifications issued by DPIIT, Ministry of Commerce & Industry, G.O.I.**

4. **Hydro Power stations cover conventional hydro power stations as well as Pump Storage Plants.**

……..

25 DRAINAGE AND DEWATERING SYSTEM

25.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation / seal / signature
1	**Power house drainage pumps**			
1.1	Type	-	Submersible-slurry	Confirmed
1.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
1.3	Unit discharge at rated head	Lpm	Higher of (6000 / discharge calculated)	Confirmed
	Rated head of the pump	m	As per head calculation	Confirmed
1.4	Duty of pump-motors	-	Continuous	Confirmed
1.5	Duty of pump-motors	-	H / F	Confirmed
1.6	Insulation class of pump-motors	-	IP 68	Confirmed
1.7	Motor service factor	-	Min. 1.1	Confirmed
1.8	Speed of pump	rpm	1450 / 1500	Confirmed
2	**Power house flood dewatering pump**			
2.1	Type	-	Submersible slurry	Confirmed
2.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
2.3	Unit discharge at rated head	Lpm	Higher of (6000 / discharge calculated)	Confirmed
2.4	Rated head of the pump	m	As per head calculation	Confirmed
2.5	Duty of pump-motors	-	Continuous	Confirmed
2.6	Insulation class of pump-motors	-	H / F	Confirmed
2.7	Protection class of pump-motors	-	IP 68	Confirmed
2.8	Motor service factor		Min. 1.1	Confirmed
2.9	Speed of pump	rpm	1450 / 1500	Confirmed
2.10	All piping, power cables, NRVs, etc included in line with PTS cl. no.25.2.1.6 & 25.5.3	-	Yes	Confirmed
3	**Power house dewatering pump**			
3.1	Type	-	Submersible slurry	Confirmed
3.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
3.3	Unit discharge at rated head	Lpm	Higher of (6000 / discharge calculated)	Confirmed
	Rated head of the pump	m	As per head calculation	Confirmed
3.4	Duty of pump-motors	-	Continuous	Confirmed

25 DRAINAGE AND DEWATERING SYSTEM

25.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation / seal / signature
3.5	Insulation class of pump-motors	-	H / F	Confirmed
3.6	Protection class of pump-motors	IP	IP 68	Confirmed
3.7	Motor service factor		Min. 1.1	Confirmed
3.8	Speed of pump	rpm	1450 / 1500	Confirmed
4	**Oil- water sump pumps in transformer cavern**			
4.1	Type	-	Submersible	Confirmed
4.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
4.3	Unit discharge at rated head	Lpm	Higher of (3000 / discharge calculated)	Confirmed
4.4	Rated head of the pump	m	As per head calculation	Confirmed
4.5	Duty of pump-motors	-	Continuous	Confirmed
4.6	Insulation class of pump-motors	-	H / F	Confirmed
4.7	Protection class of pump-motors	-	IP 68	Confirmed
4.8	Motor service factor	-	Min. 1.1	Confirmed
4.9	Speed of pump	rpm	1450 / 1500	Confirmed
5	**Transformer Cum GIS Cavern Drainage pump**			
5.1	Type	-	Submersible	Confirmed
5.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
5.3	Unit discharge at rated head	Lpm	Higher of (4000 / discharge calculated)	Confirmed
5.4	Rated head of the pump	m	As per head calculation	Confirmed
5.5	Duty of pump-motors	-	Continuous	Confirmed
5.6	Insulation class of pump-motors	-	H / F	Confirmed
5.7	Protection class of pump-motors	-	IP 68	Confirmed
5.8	Motor service factor	-	Min. 1.1	Confirmed
5.9	Speed of pump	rpm	1450 / 1500	Confirmed
6	**Drainage pumps for MAT cum Access Tunnel to Transformer Cavern**			
6.1	Type	-	Submersible	Confirmed
6.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
6.3	Unit discharge at rated head	Lpm	Higher of (4000 / discharge calculated)	Confirmed

25 DRAINAGE AND DEWATERING SYSTEM

25.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation / seal / signature
6.4	Rated head of the pump	m	As per head calculation	Confirmed
6.5	Duty of pump-motors	-	Continuous	Confirmed
6.6	Insulation class of pump-motors	-	H / F	Confirmed
6.7	Protection class of pump-motors	IP	68	Confirmed
6.8	Motor service factor	-	Min. 1.1	Confirmed
6.9	Speed of pump	rpm	1450 / 1500	Confirmed
7	**Drainage pumps for MAT**			
7.1	Type	-	Submersible	Confirmed
7.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
7.3	Unit discharge at rated head	Lpm	Higher of (6000 / discharge calculated)	Confirmed
7.4	Rated head of the pump	m	As per head calculation	Confirmed
7.5	Duty of pump-motors	-	Continuous	Confirmed
7.6	Insulation class of pump-motors	-	H / F	Confirmed
7.7	Protection class of pump-motors	IP	68	Confirmed
7.8	Motor service factor	-	Min. 1.1	Confirmed
7.9	Speed of pump	rpm	1450 / 1500	Confirmed
8	**Drainage pumps for MAT and Adit to PH crown**			
8.1	Type	-	Submersible	Confirmed
8.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
8.3	Unit discharge at rated head	Lpm	Higher of (3000 / discharge calculated)	Confirmed
8.4	Rated head of the pump	m	As per head calculation	Confirmed
8.5	Duty of pump-motors	-	Continuous	Confirmed
8.6	Insulation class of pump-motors	-	H / F	Confirmed
8.7	Protection class of pump-motors	IP	68	Confirmed
8.8	Motor service factor	-	Min. 1.1	Confirmed
8.9	Speed of pump	rpm	1450 / 1500	Confirmed

25 DRAINAGE AND DEWATERING SYSTEM

25.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation / seal / signature
9	**Drainage pumps for control block cavern**			
9.1	Type	-	Submersible	Confirmed
9.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
9.3	Unit discharge at rated head	Lpm	Higher of (3000 / discharge calculated)	Confirmed
9.4	Rated head of the pump	m	As per head calculation	Confirmed
9.5	Duty of pump-motors	-	Continuous	Confirmed
9.6	Insulation class of pump-motors	-	H / F	Confirmed
9.7	Protection class of pump-motors	IP	68	Confirmed
9.8	Motor service factor	-	Min. 1.1	Confirmed
9.9	Speed of pump	rpm	1450 / 1500	Confirmed
10	**Drainage pumps for Adit to Lower Penstock Erection Gallery**			
10.1	Type	-	Submersible	Confirmed
10.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
10.3	Unit discharge at rated head	Lpm	Higher of (3000 / discharge calculated)	Confirmed
10.4	Rated head of the pump	m	As per head calculation	Confirmed
10.5	Duty of pump-motors	-	Continuous	Confirmed
10.6	Insulation class of pump-motors	-	H / F	Confirmed
10.7	Protection class of pump-motors	IP	68	Confirmed
10.8	Motor service factor	-	Min. 1.1	Confirmed
10.9	Speed of pump	rpm	1450 / 1500	Confirmed
11	**Submersible slurry pump for Power house drainage**			
11.1	Type	-	Submersible	Confirmed
11.2	Number of pumps	Nos.	As per PTS cluase no.25.1.1	Confirmed
11.3	Unit discharge at rated head	Lpm	Higher of (3000 / discharge calculated)	Confirmed
11.4	Rated head of the pump	m	As per head calculation	Confirmed
11.5	Duty of pump-motors	-	Continuous	Confirmed
11.6	Insulation class of pump-motors	-	H / F	Confirmed
11.7	Protection class of pump-motors	IP	68	Confirmed

25 DRAINAGE AND DEWATERING SYSTEM

25.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation / seal / signature
11.8	Motor service factor	-	Min. 1.1	Confirmed
11.9	Speed of pump	rpm	1450 / 1500	Confirmed
11	**Material/ Standard/Class/Grade/ Type for**			
11.1	Pumps			
	- Pump and motor shaft	-	Stainless steel (AISI 410 or better)	Confirmed
	- Pump impeller	-	stainless steel (AISI 316 or better)	Confirmed
	- Chain , guide rail, guide support	-	Stainless steel	Confirmed
11.2	Piping			
	- Embedded piping	-	As per PTS cluase no.25.5.3	Confirmed
	- Exposed piping	-		Confirmed
12	Electromagnetic with digital display flow meter for individual pumps & common header included	-	Yes	Confirmed
13	Provisions as mentioned at PTS clause no. 25.5.3 like NRV, isolating valves, etc. are included	-	Yes	Confirmed
14	Compliance of latest standards as per PTS clause no. 25.5.1	-	Yes	Confirmed
15	Complete Compliance of Specification	-	Yes	Confirmed

29 FIRE FIGHTING SYSTEM

29.1.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation /seal / signature
1	**Fire pumps**			
1.1	Type	-	Horizontal centrifugal	Confirmed
1.2	Total number	Nos.	As per PTS clause no.29.1.1 (i)	Confirmed
1.3	Duty of pump-motors	-	Continuous	Confirmed
1.4	Designed for 150% of required capacity in LPM	-	Yes	Confirmed
1.5	Insulation class of pump-motors	-	Class F insulation (temperature rise limited to class B)	Confirmed
2	**Bore well Pumps**			Confirmed
2.1	Type	-	Vertical shaft type centrifugal	Confirmed
2.2	Total number	Nos.	As per PTS clause no.29.1.1 (iv)	Confirmed
3	**Number of automatic controlled Deluge valves for**			Confirmed
3.1	Generator	Nos.	As per the requirement and approval during detailed engineering	Confirmed
3.2	Generator transformers	Nos.	As per the requirement and approval during detailed engineering	Confirmed
3.3	Turbine oil pumping units	Nos.	As per the requirement and approval during detailed engineering	Confirmed
3.4	Main inlet valve pumping units	Nos.	As per the requirement and approval during detailed engineering	Confirmed
3.5	Bus reactors	Nos.	As per the requirement and approval during detailed engineering	Confirmed
3.7	Number of wet sprinkler valves	Nos.	As per the requirement and approval during detailed engineering	Confirmed
4	**Fire detection and alarm system**			Confirmed
4.1	Total number of detector lines	Nos.	As per the requirement and approval during detailed engineering	Confirmed
4.2	Main fire alarm panel			Confirmed

29 FIRE FIGHTING SYSTEM

29.1.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation /seal / signature
4.2.1	- Number of main panels	Nos.	as per PTS clause no.29.1.3	Confirmed
4.2.2	- Type/designation	-	Microprocessor based addressable intelligent type	Confirmed
4.2.3	- Minimum no. of loops	Nos.	5 (min)	Confirmed
4.3	Repeater panels			Confirmed
	-Nos. of repeater panels	Nos.	as per PTS clause no.29.1.3	Confirmed
4.4	Clean agent automatic direct low pressure fire suppression system	Nos.	As per PTS clause no.29.1.1	Confirmed
5	**Material/ Standard/Class/Grade/ Type for**			Confirmed
5.1	Strainers candle /element	-	Stainless steel	Confirmed
5.2	Spray nozzles	-	SS-304	Confirmed
5.3	Pump impellers	-	stainless steel (AISI 316 or better)	Confirmed
5.4	Pump shafts	-	Stainless steel (AISI 410 or better)	Confirmed
5.5	Pump casings	-	Cast steel (ASTM A 216 WCB or better)	Confirmed
6	**Automatic self-cleaning Simplex filter**			Confirmed
6.1	Type	-	Wedge wire type	Confirmed
6.2	Total number	Nos.	As per PTS clause no.29.1.1	Confirmed
6.3	Design head	m	As per the requirement and approval during detailed engineering	Confirmed
6.4	Water flow rate at design head and at maximum continuous rating	Lpm	As per the requirement and approval during detailed engineering	Confirmed
6.5	Cleaning effectiveness, particulate matter down to	micron	500	Confirmed
7	**Y strainer**			
7.1	Total number	Nos.	As per PTS clause no.29.1.1	Confirmed

29 FIRE FIGHTING SYSTEM

29.1.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation /seal / signature
7.2	Design head	m	As per the requirement and approval during detailed	Confirmed
7.3	Water flow rate at design head	lpm	As per the requirement and approval during detailed	Confirmed
7.4	Cleaning effectiveness, particulate matter down to	microns	1500	Confirmed
8	Applicable standards as per PTS clause no. 29.5.1	-	Yes	Confirmed
9	Complete compliance to Cl. No. 29.2.1	-	Yes	Confirmed
10	Complete compliance to Cl. No. 29.5.9	-	Yes	Confirmed
11	Compatibility of fire protection system with station SCADA	-	Yes	Confirmed
12	Complete compliance to cl. No. 29.5.11	-	Yes	Confirmed
13	Confirmation for separate inlet (filling) and outlet pipeline from water tank	-	Yes	Confirmed
14	Complete Compliance of Specification	-	Yes	Confirmed

URI I STAGE II HYDROELECTRIC PROJECT

Volume III C
(TDS)

30 OIL HANDLING SYSYTEM

30.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation /seal / signature
1	**Insulating oil system**			
1.1	Tyre mounted large plant	-		Confirmed
1.2	- Type	-	Vaccum type	Confirmed
1.3	- Number supplied	Nos.	as per PTS clause no.30.1.1	Confirmed
1.4	- Rate of oil flow	LPH	6000	Confirmed
2.2	Capabilty of insulating oil purifying plant both small and large, after single pass			Confirmed
2.2.1	Moisture content	PPM	<5	Confirmed
2.2.2	Filtration	micron	<1	Confirmed
2.3	Tyre mounted large insulating oil tanks			Confirmed
2.3.1	- Number	Nos.	As per PTS clause no.30.1.1	Confirmed
2.3.2	- Capacity of tank	Litre	22000	Confirmed
2.3.3	Transfer pump			Confirmed
2.3.4	- Type	-	Mobile skid mounted	Confirmed
2.3.5	- Number of pumps	Nos.	As per PTS clause no.30.1.1	Confirmed
2.3.6	- Pumping capacity	LPH	3000	Confirmed
2.3.7	- Duty of pump-motors	-	Continuous	Confirmed
2.3.8	- Insulation class and protection class of pump-motors	-	F, IP-55	Confirmed
2.4	Air dryers			Confirmed
2.4.1	- Number supplied	Nos.	As per PTS clause no.30.1.1	Confirmed
2.4.2	- Capacity of air dryer	m^3/min.	>2	Confirmed
2.5	Oil Hoses			Confirmed
2.5.1	- Number	Nos.	As per the requirement and approval during detailed engineering	Confirmed
2.6	Evacuation system for transformer tanks			Confirmed
2.6.1	- Number	Nos.	As per PTS clause no.30.1.1	Confirmed
2.6.2	- Pumping capacity of vacuum pumps	Lpm	As per the requirement and approval during detailed engineering	Confirmed
2.6.3	- Duty of pump-motors	-	Continuous	Confirmed
2.6.4	- Insulation class and protection class of pump-motors	-	F, IP-55	Confirmed

URI I STAGE II HYDROELECTRIC PROJECT

Volume III C
(TDS)

30 OIL HANDLING SYSYTEM

30.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation /seal / signature
2.7	Vacuum Hoses			Confirmed
2.7.1	- Number	Nos.	As per the requirement and approval during detailed engineering	Confirmed
3	**Lubricating oil system**			Confirmed
3.1	Capabilty of lubricating oil purifying plant, after not more than two passes			Confirmed
3.1.1	Moisture content	PPM	<50	Confirmed
3.1.2	Free water reduction	%	100	Confirmed
3.1.3	Filtration	micron	Not more than 1	Confirmed
3.1.4	Centrifuge type skid mounted plant			Confirmed
3.1.4.1	- Number supplied	Nos.	As per PTS clause no.30.1.2	Confirmed
3.1.4.2	- Rate of oil flow	LPH	1200	Confirmed
3.1.4.3	- Pumping capacity	LPH	1200	Confirmed
3.1.4.4	- Total heating capacity	kW	As per the requirement and approval during detailed engineering	Confirmed
3.2	Tyre mounted lubrication oil tanks			Confirmed
3.2.1	- Number	Nos.	As per PTS clause no.30.1.2	Confirmed
3.2.2	- Capacity	Litre	5000	Confirmed
3.3	Transfer pump			Confirmed
3.3.1	- Number of pumps	Nos.	As per PTS clause no.30.1.2	Confirmed
3.3.2	- Pumping capacity	LPH	1200	Confirmed
3.3.3	- Duty of pump-motors	-	Continuous	Confirmed
3.3.4	- Insulation class and protection class of pump-motors	-	F, IP-55	Confirmed
3.4	Oil Hoses			Confirmed
3.4.1	- Number	Nos.	As per the requirement and approval during detailed engineering	Confirmed
3.4.2	- Size	mm		Confirmed
3.4.3	- Minimum length	m		Confirmed
3.4.4	- Flow rate	Lpm		Confirmed

URI I STAGE II HYDROELECTRIC PROJECT

Volume III C
(TDS)

30 OIL HANDLING SYSYTEM

30.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation /seal / signature
4	**Material/ Standard/Class/Grade/ Type for**			Confirmed
4.1	Oil tank	-	Plate steel conforming to ASTM A516 Grade-60 in accordance with part UW of the ASME Code for Unfired Pressure Vessels, Section VIII	Confirmed
5	Transformer evacuation system as per clause no. 30.3.1.2 of PTS	-	Yes	Confirmed
6	Compliance of latest standards as per PTS clause no. 30.5.1	-	Yes	Confirmed
7	Complete Compliance of Specification	-	Yes	Confirmed

31 MECHANICAL WORKSHOP

31.1	**Guaranteed Technical Particulars**			
Item / Clause No.	**Parameter**	**Unit**	**Requirement**	**Bidder's confirmation /seal / signature**
1	Complete compliance to PTS (Chapter - 31) with reputed International / National makes	-	Yes	Confirmed

32 ELEVATOR

32.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation / seal / signature
1	**ELEVATOR**			
1.1	Type	-	Passenger	Confirmed
1.2	Rated capacity of elevator	Kg / persons	1088 / 16	Confirmed
1.3	Levelling accuracy	mm	± 5mm	Confirmed
1.4	Factor of safety			Confirmed
1.4.1	- Wire ropes	-	6(minimum)	Confirmed
1.4.2	- Other parts	-	5(minimum)	Confirmed
1.5	Rated speed (at rated load)	m/sec	1	Confirmed
1.6	Number of landings	Nos.	6	Confirmed
1.7	Lifting height	m	23.7	Confirmed
1.8	Well dimensions	mmxmm	2500 X 2100	Confirmed
1.9	Motor			Confirmed
1.9.1	Rated power	kW	Vendor to specify	Confirmed
1.9.2	Rated voltage	V	415	Confirmed
1.9.3	Rated frequency	Hz	50	Confirmed
1.9.4	Relative duty factor	%	40	Confirmed
1.9.5	Degree of protection	-	IP 55	Confirmed
1.9.6	Type of speed control	-	VVVF	Confirmed
1.10	Material			Confirmed
1.10.1	- car frame	-	Mild steel	Confirmed
1.10.2	- car enclosure	-	Stainless steel	Confirmed
1.10.3	- car doors	-	Stainless steel	Confirmed
1.10.4	- platform	-	Stainless steel	Confirmed
1.11	Two years of service / maintenance	-	Yes	Confirmed
1.12	Safety certification from concerned authority may be submitted	-	Yes	Confirmed
1.13	Compliance of latest standards as per clause no. 32.5.1 of PTS	-	Yes	Confirmed
1.14	Provisions for emergency exit as per clause no. 32.5.4 of PTS	-	Yes	Confirmed
1.15	Complete Compliance of Specification	-	Yes	Confirmed

33 SECURITY AND SURVEILLANCE SYSTEM

33.1 Guaranteed Technical Particulars

Item / Clause No.	Parameter	Unit	Requirement	Bidder's confirmation / seal / signature
A	**ACCESS CONTROL SYSTEM**			
1	**Performance data**			Confirmed
1.1	Interfacing with plant LAN	-	Yes	Confirmed
1.2	Interfacing with CCTV system	-	Yes	Confirmed
1.3	Interfacing between power house and dam complex	-	Yes	Confirmed
2	**Characteristic data**			Confirmed
2.1	Access control panel			Confirmed
2.1.1	Type	-	Modular	Confirmed
2.1.2	Number of time Zones	Nos.	To be decided during detailed engineering	Confirmed
2.2	Proximity card reader			Confirmed
2.2.1	Minimum number of units	Nos.	>10 or as decided during detailed engineering	Confirmed
2.2.2	Output type	-	Digital	Confirmed
2.3	Access control software			Confirmed
2.3.1	Password facility	-	Yes	Confirmed
2.4	Proximity Card			Confirmed
2.4.1	Number	-	> 300 or as decided during detailed engineering	Confirmed
B	**CCTV SURVEILLANCE SYSTEM**			Confirmed
1	**Performance data**			Confirmed
1.1	Interfacing with plant LAN	-	Yes	Confirmed
1.2	Interfacing with access control system	-	Yes	Confirmed
1.3	Interfacing between power house and dam complex	-	Yes	Confirmed
2	**Characteristic data**			Confirmed
2.1	Camera			Confirmed
2.1.1	Type	-	PTZ	Confirmed
2.1.2	Minimum Number of units	Nos.	To be decided during detailed engineering	Confirmed
2.1.3	Angle of rotation	Degree	360^{o}; valuable scan speed (1-40 degree/sec)	Confirmed
2.1.4	Minimum illumination	Lux	0.5 lux(colour); 0.05 lux (B/W)	Confirmed
2.1.5	Signal-to-noise ratio	dB	> 50	Confirmed

2.2	Portable camera			Confirmed
2.2.1	Minimum number of units	Nos.	2	Confirmed
2.2.2	Angle of rotation	Degree	360°; valuable scan speed (1-40 degree/sec)	Confirmed
2.2.3	Minimum illumination	Lux	0.5 lux(colour); 0.05 lux (B/W)	Confirmed
2.2.4	Signal-to-noise ratio	dB	> 50	Confirmed
2.3	Pan tilt & zoom unit			Confirmed
2.3.1	Pan range	degrees	0-360°	Confirmed
2.3.2	Tilt range	degrees	+2 to -92°	Confirmed
2.3.3	Protection class (IP)	-	IP 66	Confirmed
2.4	Camera housings			Confirmed
2.4.1	Protection class (IP)	-	IP 66	Confirmed
2.4.2	Material construction	-	weather proof environment housing made of Aluminium	Confirmed
2.4.3	Operating temperature range	oC	-0.5° to 40°C	Confirmed
2.5	Digital video recorder			Confirmed
2.5.1	Minimum number of units	Nos.	1	Confirmed
2.5.2	Remote control		Yes	Confirmed
2.6	High resolution colour monitors			Confirmed
2.6.1	Minimum number of units	Nos.	4 nos in security & servillance room	Confirmed
2.6.2	Screen dimension	inch	26	Confirmed
2.6.3	Minimum resolution	pixel	1080P (1920X1080)	Confirmed
2.7	Interfacing accessory	-	Yes	Confirmed
2.8	Personal Computer			Confirmed
2.8.1	Type	-	Latest versions of processor & windows OS	Confirmed
2.8.2	Minimum number of units	Nos.	5	Confirmed
2.8.3	SSD capacity	TB	2	Confirmed
2.9	Printer			Confirmed
2.9.1	Type / designation	-	high speed laser type	Confirmed
2.9.2	Minimum number of units	Nos.	4	Confirmed
2.9.3	Print speed	pages/ minute	15	Confirmed
2.10	Key Board & mouse		wireless	Confirmed
2.10.1	Minimum number of units	Nos.	5	Confirmed
2.11	Large screen display-Smart FHD LED TV			Confirmed
2.11.1	Minimum number of units	Nos.	1	Confirmed
2.11.2	Screen dimension	inch	85	Confirmed
C	Complete Compliance of Specification	-	Yes	Confirmed

Attachment 6_Technical_D_Amendment_02

FOR OFFICES / STORE AND
CABLE SPREADING ROOM / CABLE TRAYS

FIRE FIGHTING TANK

RADAR TYPE LEVEL SENSOR

RADAR TYPE LEVEL SENSOR

LI LS LT LT LS LI

HL HL

FIRE FIGHTING
STORAGE TANK

LL LL

VLL VLL

OVERFLOW

TO DRAIN

VISUAL

OVERFLOW

TO DRAIN

MAKE WATER
TANK

BOREWELL

TAPPING FROM TRT
UNIT # AU

DRAINAGE GALLERY/TRENCH

TAPPING FROM TRT
UNIT # 1

DRAINAGE GALLERY/TRENCH

PG PS M FS FM

CABLE TUNNEL

BULK OIL
STORAGE TANK

SHAFT SEAL FEEDER

CONTROL BLOCK

TO MAKE WATER TANK

BUS REACTOR

GIS HALL

I/C CABLE GALLERY

TRANSFORMER CAVERN

MACHINE HALL

GOVERNOR
OPU

GOVERNOR
OPU

UNIT-1

UNIT-2

Generator floor

Turbine floor

MIV
OPU

MIV
OPU

MIV FLOOR / RUNNER
REMOVEL FLOOR

LEGEND:-

- NORMALLY OPEN VALVE
- NORMALLY CLOSED VALVE
- MOTORIZED VALVE WITH MANUAL OVER RIDE
- GATE VALVE
- HAND OPERATED BUTTERFLY VALVE
- CHECK VALVE
- LS — LEVEL SWITCH
- M — MOTORISED WATER CIRCULATION PUMP
- AUTOMATIC SAELF CLEANING SIMPLEX STRAINER
- WET SPRINKLER SYSTEM
- DELUGE SYSTEM
- VALVE WITH COUPLING (HYDRANT)
- PRESSURE SAFETY VALVE
- Y-STRAINER
- RADAR TYPE LEVEL SENSOR
- PG — PRESSURE GAUGE
- FM — FLOW METER
- LS — LEVEL SWITCH
- LI — LEVEL INDICATOR
- LT — LEVEL TRANSMETER(RADAR TYPE)
- PT — PRESSURE TRANSMITER
- PRESSURE REDUCING VALVE
- SILT FLUSHING LINE

TENDER DRAWING
NOT FOR CONSTRUCTION

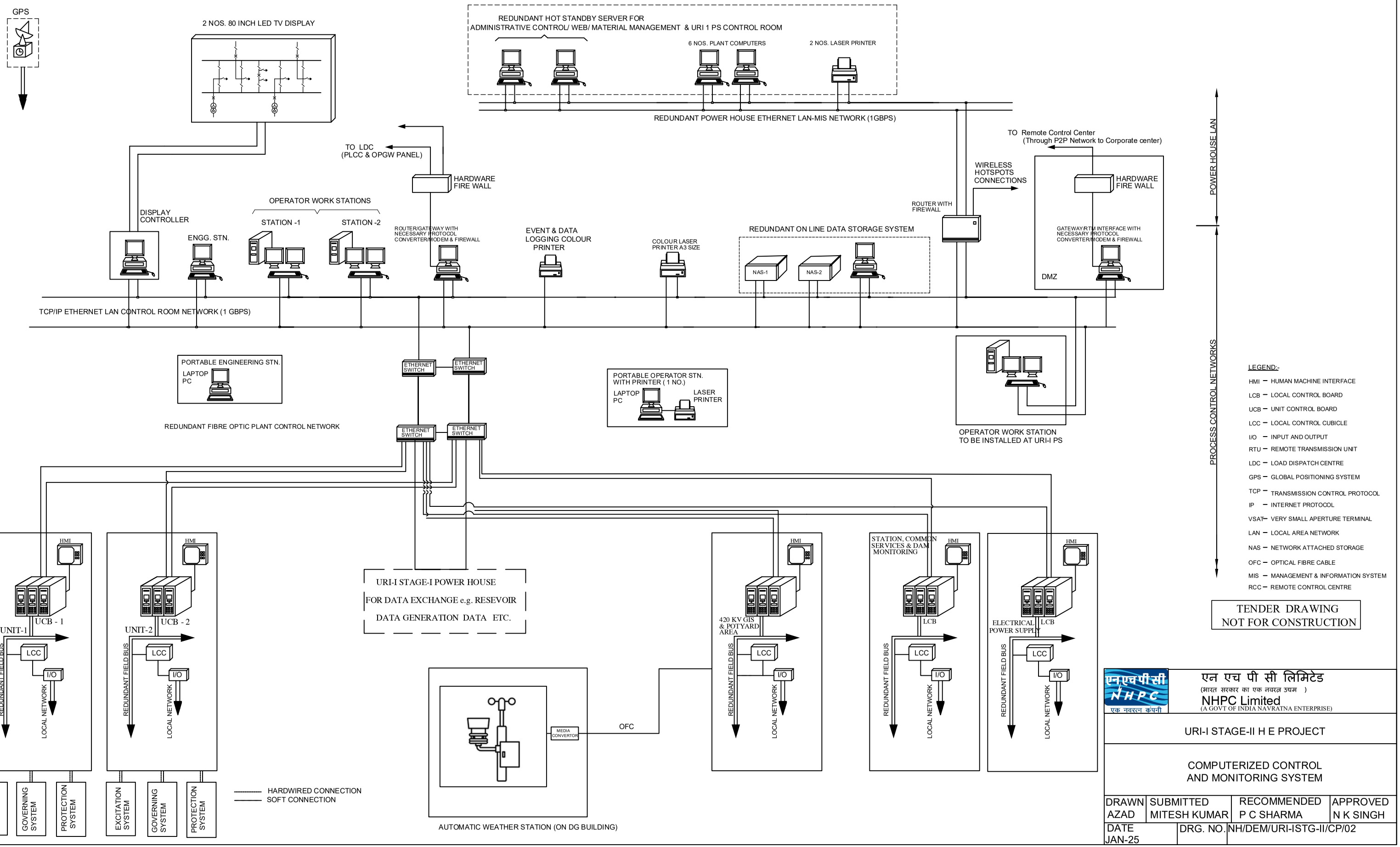
एन एच पी सी लिमिटेड
(भारत सरकार का एक नवरत्न उद्यम)
NHPC Limited
(A GOVT OF INDIA NAVRATNA ENTERPRISE)
एक नवरत्न कंपनी

URI-I STAGE-II H E PROJECT

FIRE FIGHTING SYSTEM

DRAWN	SUBMITTED	RECOMMENDED	APPROVED
AZAD	MITESH KUMAR	P C SHARMA	N K SINGH
DATE	DRG. NO.	NH/DEM/URI-STG-II/FF/01	
JAN-25			

Attachment 6_Technical_D_Amendment_02



LEGEND:-

HMI – HUMAN MACHINE INTERFACE
LCB – LOCAL CONTROL BOARD
UCB – UNIT CONTROL BOARD
LCC – LOCAL CONTROL CUBICLE
I/O – INPUT AND OUTPUT
RTU – REMOTE TRANSMISSION UNIT
LDC – LOAD DISPATCH CENTRE
GPS – GLOBAL POSITIONING SYSTEM
TCP – TRANSMISSION CONTROL PROTOCOL
IP – INTERNET PROTOCOL
VSAT – VERY SMALL APERTURE TERMINAL
LAN – LOCAL AREA NETWORK
NAS – NETWORK ATTACHED STORAGE
OFC – OPTICAL FIBRE CABLE
MIS – MANAGEMENT & INFORMATION SYSTEM
RCC – REMOTE CONTROL CENTRE

TENDER DRAWING
NOT FOR CONSTRUCTION

एन एच पी सी लिमिटेड
(भारत सरकार का एक नवरत्न उद्यम)
NHPC Limited
(A GOVT OF INDIA NAVRATNA ENTERPRISE)
एक नवरत्न कंपनी

URI-I STAGE-II H E PROJECT

COMPUTERIZED CONTROL
AND MONITORING SYSTEM

DRAWN	SUBMITTED	RECOMMENDED	APPROVED
AZAD	MITESH KUMAR	P C SHARMA	N K SINGH

DATE	DRG. NO.	
JAN-25		NH/DEM/URI-ISTG-II/CP/02

NHPC LIMITED
(A Govt. of India Navratna Enterprise)
NHPC Office Complex, Sector-33, Faridabad-121003, Haryana (India)
CIN: L40101HR1975GOI032564

Dated: 09.09.2025

Informative Replies-2

Name of Work: Lot-III: Electro-mechanical works package of 240 MW (2X120MW) Uri-I Stage-II H.E Project, Baramulla District of UT of J&K, India.

Ref: Tender Specification No. NH/ NH/ Conts(E&M)-III/ Uri-I Stage-II/ ENM/ 2025/ 01

[E-Tender ID: 2025_NHPC_861342_1]

The replies/clarifications against pre & post pre-bid meeting queries for the subject tender **not affecting the terms and conditions of tender document** is hereby attached as **"Informative Replies-2"** and annexed as Part-A, Part-B & Part-C for information please.

Sd/-

General Manager,
Contracts (E&M)-III,
2nd Floor, Jyoti Sadan, NHPC Office Complex,
Sector-33, Faridabad-121003 (Haryana),
Tele # 0129-2254687
E-mail: nalinikantverma@nhpc.nic.in

INFORMATIVE REPLIES-2

PART-A

Sl. No.	Corrigendum no. 2	Queries	NHPC Reply/ Clarifications	Volume, Page No., Clause No.	Tender Provision	Queries	NHPC Reply
1	Informative Replies dtd 23.07.2025 Part-C sl no. 158, Page no. 21/53	Since the scope includes outgoing feeder terminations at GIS end of Uri Power station Stage-I. Please provide the following information:- a) Spare Line bay feeder with XLPE cable termination module is already existing in Uri-Stage-I GIS. Please confirm. b) Please provide the make of GIS at Uri-1 Stage-I. c) Bidder scope at Uri-1 Stage-1 GIS area is limited to termination of the 400kV xlpe cables only. Further testing and commissioning of the Line bay feeder(including gas filling) is not envisaged in the current scope. Please confirm. d) Bidder understand arranging GIS OEM at Uri-1 Stage -1 GIS during termination of 400kV XLPE cable is not under bidder scope. Please confirm. e)Bidder scope at Uri-1 Stage-1 Pothead Yard area is limited to termination of the 400kV xlpe cables at the cable sealing end only. Further connection from CSE to Pothead Yard feeder bay is not envisaged in the current scope. Please confirm.	Make of GIS at Uri I is M/s ABB. Tender provisions are clear. Kindly adhere to tender specifications.	Volume-IIIB (PTS) XLPE Cable Page No. 10-1 Clause No. 1.10.2.1 i)	Eight (8) nos. Single-phase, 400kV copper conductor, Fibre Optic embedded XLPE cables of minimum 2000 mm2 for interconnection with two outgoing bays of GIS of Uri I Stage II Project, (i.e one with outgoing bay of Uri I Stage I GIS and other with existing line bay at pothead yard of Uri I Stage I) A) Power House Area Caverns General Arrangement Plan (Drg no. NHUR-I(II)-4CT1-41-GA-043) B) Power House Cable Cum vertilation Tunnel Plan (Drg no. NHUR-I(II)-4CT1-41-GA-063) C) Power House Cable cum vertilation Tunnel Section (Drg no. NHUR-I(II)-4CT1-41-GA-064)	A) Bidder understand at present there are no spare line feeders available in the Uri-1 Stage-I GIS, 02 number equipped line feeders are connected to 02 no line bays in the potheadyard through 400kV XLPE cable. The current scope includes :- disconnection of one Line bay in potheadyard with stage-I GIS and connection of the same with Stage-II GIS. Please confirm. B) Bidder understand PLCC Panels for both the line bays is already available. Please clarify the PLCC scope for the Stage-II tender. C) Bidder sought following clarification in the scope at the existing GIS of Uri -1 Stage-1 :- a) Dismantling of existing 400kV Cable module for 01 number line bay feeder and installation of New 400kV Cable module. Since the cable modules is of proprietory make(i.e M/s ABB make), hence it s requested to please exclude procurment of cable modules from the current scope. b) Bidder understand sufficient space is available in the trench to lay new 400kV XLPE cable and Dismantling of the existing 400kV XLPE cable (inluding online PD monitoring /Real time temperature monitoring system with Distributed Temperature Sensing (DTS)-if available)between existing Line bay feeder and Potheadyard is not envisaged , please confirm. c) Bidder scope at Uri-1 Stage-1 GIS area is limited to termination of the 400kV xlpe cables only for which M/s ABB Supervision will be arranged by employer. Further re-testing and commissioning of the Line bay feeder (including gas filling) is not envisaged in the current scope. Please confirm.	1.PLCC Panels for both the line bays is already available. Refer ammendment Tender provisions are clear
2	Informative Replies dtd 23.07.2025 sl no. 162 Page no. 21/53	A) Bidder request to exclude/delete the below mentioned clause as OEMs will not be able to comply. "All the partition/ compartment shall be designed for one side at rated pressureand other side at vacuum so as to perform maintenance safely". However,Bidder confirms compliance of service continuity as per S. No. b, c, f and g. Please confirm.	Kindly adhere to tender specifications	Volume-IIIB (PTS) GIS Page No. 8 Clause No. 11.5.2.d)	d) All the partition/ compartment shall be designed for one side at rated pressure and other side at vacuum so as to perform maintenance safely. The contractor shall demonstrate through gas compartment segregation or otherwise how compliance of service continuity as per S. No. b, c, f and g are achieved.	Bidder understand for the below mentioned clause necessary type test report supporting the same will be submitted for employer review. Practical demonstration during maintenance is not advised. Please accept and confirm. **"All the partition/ compartment shall be designed for one side at rated pressureand other side at vacuum so as to perform maintenance safely".** However,Bidder confirms compliance of service continuity as per S. No. b, c, f and g. Please confirm.	Confirmed
3	Informative Replies dtd 23.07.2025 sl no. 164 Page No. 22/53	a)The number of CTs will be as per the single line diagram for 420 kV GIS given in drawing no. NH/DEMI URI I STG II/SLD/02 . Please confirm b) In case of additional requirements please provide the details of the same for consideration in the bid estimates.	Tender provisions are clear. Kindly adhere to tender specifications	Volume-IIIB (PTS) GIS Page No. 12 Clause No. 11.5.7	Scope shall cover any additional CTs and/or no. of cores for CTs for additional protection and metering if felt necessary during detailed engineering.	a)Requirement of additional CTs will increase GIS size and Cost, please provide the maximum number of CTs envisaged. B)Bidder understand separate metering CTs are not required for tarrif purpose. Please confirm	Tender provisions are clear. Kindly adhere to tender specifications
4	Informative Replies dtd 23.07.2025 sl no. 165 Page No. 22/53	a)The number of VTs will be as per the single line diagram for 420 kV GIS given in drawing no. NH/DEMI URI I STGII/SLD/02 . Please confirm b) In case of additional requirements please provide the details of the same for consideration in the bid estimates.	Tender provisions are clear. Kindly adhere to tender specifications	Volume-IIIB (PTS) GIS Page No. 12 Clause No. 11.5.8	Scope shall cover any additional VTs and/or no. of cores for VTs for additional protection and metering if felt necessary during detailed engineering.	a)Requirement of additional VTs will increase GIS size and Cost, please provide the maximum number of VTs envisaged.	Tender provisions are clear

Sl. No.	Corrigendum no. 2	Queries	NHPC Reply/ Clarifications	Volume, Page No., Clause No.	Tender Provision	Queries	NHPC Reply
5	Informative Replies dtd 23.07.2025 sl no. 4 Page No. 7/53	Employer is requested to allow bidder to decide main inlet valve diameter as per design and in line with spiral inlet diameter. Kindly confirm	Kindly adhere to tender specifications	Volume-IIIB (PTS) Spherical valve Page No. 4-12 Clause No. 4.1.1	1) Two (2) sets of 2.8 m diameter turbine main inlet Valves	MIV diameter has been specified as 2800 mm as per tender specifications and taper pieces are envisaged on either side of the MIV. Accordingly, it does not seem feasible to accommodate the taper pieces & MIV within the specified power house width of 20 m. It is thus requested that bidders may either be allowed to offer suitable MIV diameter as per their optimum design or increase the power house width atleast by 1.5 - 2.0 m. May kindly review and confirm.	kindly adhere to tender specifications
6	Volume-IIIB (PTS) TURBINE AND ACCESSORIES	2-24	2.5.6.1	runner blade trailing edge thickness is a critical design parameter with significant impact on various parameters including turbine efficiency, optimum discharge, pressure pulsations and cavitation. We wish to submit that the requirement of 15-20 % higher thickness than the optimum design is understandable from silt erosion consideration in case HVOF coating is not specified. However, since HVOF coating is to be provided on the runners in URI I Stage II project, the requirement of higher thickness is not justified. Further, the absolute value of 16 mm is not suitable for the particular project parameters of the subject project. Please note the following in this regard: A) Absolute dimensions of the turbine runner including trailing edge thickness depend upon a number of parameters including maximum net head, machine rating, efficiency requirement & size of the prototype turbine etc. In other words, even for the same turbine model, as the rating & size of the prototype turbine changes, the absolute dimensions also change accordingly. Hence, a universal value of trailing edge thickness of 16 mm is not justified. Though we can guarantee that the runner blade trailing edge thickness shall be kept 15-20 % higher than the most optimum value, but an absolute value like 16 mm cannot be guaranteed. B) Trailing edge thickness is a critical design parameter that defines the runner blade outlet opening and hence, the discharging capacity of the turbine. Changes to this parameter cause significant variations in the operating characteristics of the turbine model. Thus, it is in the best interest of the project that this critical design parameter should be left for the hydraulic designer to decide. C) Higher the trailing edge thickness, lesser is the turbine efficiency. For such abnormally high value of 16 mm trailing edge thickness, the turbine efficiency is likely to deteriorate which is not in the interest of the project. D) Value of 16 mm trailing edge thickness may be suitable for a very large sized prototype machine, which is not the case here, hence this value is not justified. E) There is no analytical, documentary or historical evidence in support of such requirement of '16 mm' trailing edge thickness universally for Francis turbine runners. In view of the above, we would request Employer to review their requirement of 16 mm trailing edge thickness and modify the tender clause as "However, in view of anticipated silt concentration runner blade thickness at outlet edges shall maybe approx. 15-20% more than the optimum design and runner blade thickness at trailing edge shall not be less than 16 (sixteen) mm. ". Please accept and confirm.		Refer Ammendment
7	NIT		Cl No.1.1 (v)	Rs. 480.59 Cr. (Inclusive of GST)	Employer is requested to kindly provide Base Date of Estimated cost.		March 2025 PL

INFORMATIVE REPLIES-2

PART-B

Sl. No.	Section Chapter/ Clause	Heading	Pre bid Question	NHPC Reply
1	IFB Clause 20 – vi)	Precaution for safeguarding environment	Maintenance of the existing roads shall be in Civil Contractor scope and are to be excluded from E&M Contractor's scope. Please review and confirm.	Referred clause is quite clear. Please adhere to bid specifications.
2	Vol. IIIC	Technical Data sheet (TDS)	Kindly furnish the editable copy of the technical data sheet	Kindly adhere to tender specifications. Further, refer Corrigendum 02 in this regard.
3	Vol. IIIB, Section-7 _ IPBD	Clause 7.8, Mandatory spares, Sr. No-11	Kindly clarify the quantity of spares required for rubber bellows and metallic bellows.	Refer amendment
4	Vol. IIIB, Section-8 _ GSU Transformers	Clause 8.1.1-i), GSU Transformer	We understand that requirement of HV Cable box is not applicable. Kindly confirm.	Bid provisions are clear
5	Vol. IIIB, Section-8 _ GSU Transformers	Clause 8.3-11), Rating and Functional characteristics	We understand that the HV bushing shall be Oil / SF6 type instead of Oil / Oil type. Please confirm.	Refer amendment- Already issued
6	Vol. IIIB, Section-8 _ GSU Transformers	Clause 8.3-21), Rating and Functional characteristics	We understand that the short-circuit withstand time of GSU shall be 2 seconds instead of 3 seconds. Please confirm.	kindly adhere to tender specifications
7	Vol. IIIB, Section-8 _ GSU Transformers	Clause 8.3-22), Rating and Functional characteristics	As per IS: 2026, the temperature rise for oil and winding shall be 55 & 60 deg C respectively instead of 45 & 50 deg C respectively. Please confirm.	kindly adhere to tender specifications
8	Vol. IIIB, Section-8 _ GSU Transformers	Clause 8.5.4.1, Bushings	We understand that HV bushings shall be RIP type. However, LV and Neutral bushings shall be OIP type. Please confirm.	Refer amendment - Already issued
9	Vol. IIIB, Section-8 _ GSU Transformers	Clause 8.5.25, Surge Arresters	We understand that the HV side of GSU is connected via. GIB and not with 400kV XLPE Cable. Hence, the requirement of SF6 type LA is not applicable. Please confirm.	Bid provisions are clear
10		Short-circuit test requirement	As per QAP, short circuit test is not mandatory if the type test report of similar rating is available. However, as per PTS, the short-circuit test is mandatory. Kindly clarify.	Refer amendment
11	Vol. IIIB, Section-9 _ Reactor	Clause 9.3-15-i), Rating and Functional characteristics	We understand that the HV bushing shall be Oil / SF6 type instead of Oil / Cable type. Please confirm.	Refer amendment - Already issued
12	Vol. IIIB, Section-9 _ Reactor	Clause 9.3-25), Rating and Functional characteristics	As per IS: 2026, the temperature rise for oil and winding shall be 55 & 60 deg C respectively instead of 45 & 50 deg C respectively. Kindly confirm.	kindly adhere to tender specifications
13	Vol. IIIB, Section-10 _ 400kV XLPE Cable	Clause 10.2.1, Layout and General Arrangement	Kindly specify the length of each run for each connection: 1. GIS of Uri-1 Stage-II to GIS of Uri-1 Stage-I 2. GIS of Uri-1 Stage-II to PHY of Uri-1 Stage-I Also, kindly specify the variation in % OR length that shall not be adjustable. If the length of the 400kV XLPE cable exceeds beyond the variation limit, the same shall be charged extra by E&M Contractor. Kindly confirm.	1.For length of cables Kindly refer layout drawings 2.Refer Amendment

Sl. No.	Section Chapter/ Clause	Heading	Pre bid Question	NHPC Reply
14	Vol. IIIB, Section-10 _ 400kV XLPE Cable	Clause 10.2.3, Design Considerations	The sheath voltage under full load conditions shall be calculated and finalized during detail engineering. Please confirm.	kindly adhere to tender specifications
15	Vol. IIIB, Section-10 _ 400kV XLPE Cable	Clause 10.3, Rating and Functional Characteristics	We kindly request you to review the rated normal current. The requirement of 1800Amps looks on very higher side.	kindly adhere to tender specifications
16	Vol. IIIB, Section-11 _ 400kV GIS	Clause 11.3-D-v), Ratings and Functional Characteristic	Rated bus transfer current shall be as per IEC 62271-102. Kindly confirm.	Refer Amendment
17	Vol. IIIB, Section-16 _ Cabling System	Clause 16.2.1-2), Layout and General Arrangement	Statutory clearances required, if any, shall be arranged by the employer and excluded from E&M contractor scope. The cable laying shall be in the area of possession by NHPC and not E&M contractor. Please confirm.	kindly adhere to tender specifications
18	Vol. IIIB, Section-27 _ Grounding System	Clause 27.2.1 – Layout and General Arrangement	Civil work like excavation and backfilling for laying of the conductors and electrodes for the earth mat shall be in Civil contractor scope. Please confirm.	Bid provisions are clear
19	Vol I – Detailed Project Schedule and GCC 8.2	Detailed Project Schedule and GCC 8.2	As per detailed Project Schedule, Completion Time for E&M works shows 44 months whereas as per GCC 8.2 it is 38 months. Please clarify	Bid provisions are clear. Please refer IFB Cl. No. 19-iii).
20	Volume-IIIB/ PTS Cl 25.2.1.6 / Page 25-4 Vol IV – Tender Drawings	25.2.1.6 Civil areas/ works Additional area drainage Drawing No. NHUR-I(II)/4AT1/41/GA/00 4/00	Kindly provide length of below tunnels and Adits to estimate the drainage volume as well as pipe lengths: □ Main Access tunnel (MAT) □ MAT and Adit to Powerhouse cavern crown □ Adit cum Cable Gallery □ Cable cum Escape Tunnel (02 Nos) □ Adit to lower Penstock Erection gallery Above information is necessary to estimate the pump capacity and losses in the pipe. Also please provide section drawings of above-mentioned tunnels.	Kindly refer layout drawings
21	Volume-1 Information For Bidder (IFB) / Clause 4 Volume-4 Tender Drawings	Salient Features – Surge Shaft and Surge gallery for downstream water conductor	Please provide below details - Surge shaft orifice diameter and orifice loss coefficients. Also provide cross section drawing showing these details. - Downstream Surge gallery cross-section drawing. We need above details as the same are Not specified in given clause and drawings.	Please refer attached Annexure-A & B to this Informative Replies and is for information purpose only.
22	Vol V – Forms and Procedures	Appendix 2 Price Adjustment	Please delete the Price adjustment ceiling limit of 25% similarly in line with Dibang HEP and other similar projects	Please dahere to bid provisions.
23	General		Please provide all the documents including Technical Specifications in searchable PDF version (not scanned)	Please dahere to bid provisions.
24	Model Quality Assurance Plan(QAP) for GSY Transformer/8C Special Test	Short Cricuit Test	As per QAP, short circuit test is not mandatory if the type test report of similar rating is available. However, as per PTS, the short-circuit test is mandatory. Kindly clarify.	Please adhere to bid conditions against Sl. No.-8C e) of MQAP

INFORMATIVE REPLIES-2

PART-C

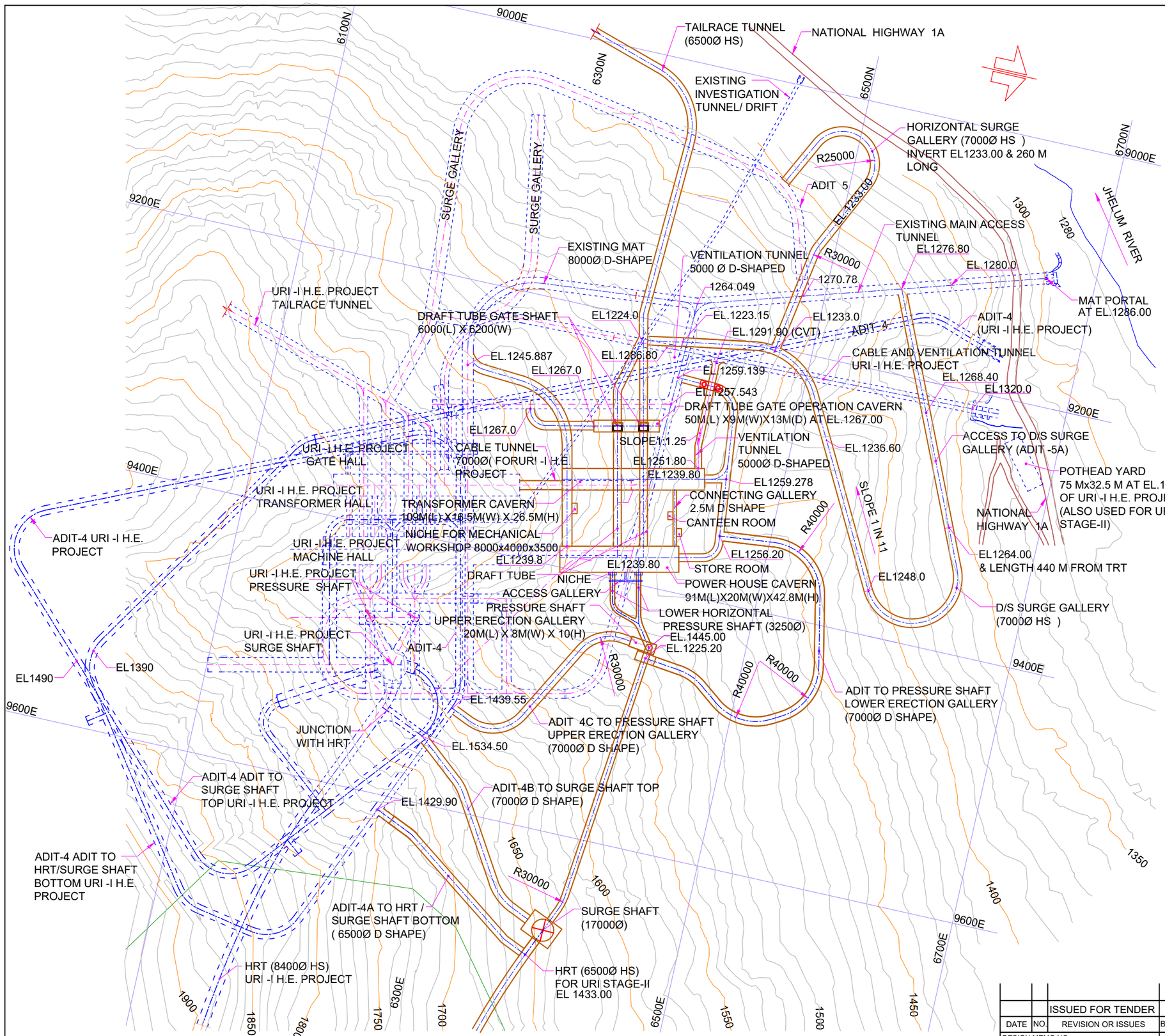
Sr. No.	Volume	Clause No.	Original Language	Queries	NHPC Reply
1	Volume -0, ITB	2.2.7	**APPLICATIONS/ BIDS BY MERGED/ ACQUIRED/ SUBSIDIARY COMPANIES:** If the Bidder Company is a Subsidiary Company and applies for qualification on the unconditional technical and financial strength of the Parent/Holding Company, the same shall be considered provided the Parent/Holding Company commits to sign a Separate Agreement	We request NHPC to modify this clause as under:- If the Bidder Company is a Subsidiary Company and applies for qualification on the unconditional technical and **/ or** financial strength of the Parent/Holding Company, the same shall be considered provided the Parent/Holding Company commits to sign a Separate Agreement. **Please accept.**	Please adhere to Bid specifications.
2	Volume V (Forms & Procedures)	FORM-13	**UNDERTAKING FROM PARENT/ HOLDING COMPANY** We, M/s…….. (Name of the Parent/Holding Company) having registered office at ……(Address of the Parent/Holding Company) do hereby undertake that in case work ……..(Name of work) is awarded to M/s……..(Name of the Bidder) who is participating in your subject Tender as a Sole Bidder / Constituent of JV, which is our subsidiary company , we on our strength / strength of (name of group company(ies)) under our control shall provide the full support for technical and financial requirements for the work "……." (the scope of work of subsidiary company) and we shall be responsible for the successful completion of the scope of works of M/s…… (Name of the Bidder subsidiary company).	We request NHPC to modify this clause as under:- We, M/s…….. (Name of the Parent/Holding Company) having registered office at ……(Address of the Parent/Holding Company) do hereby undertake that in case work ……..(Name of work) is awarded to M/s……..(Name of the Bidder) who is participating in your subject Tender as a Sole Bidder / Constituent of JV, which is our subsidiary company , we on our strength / strength of (name of group company(ies)) under our control shall provide the full support for technical and**/or** financial requirements for the work "……." (the scope of work of subsidiary company) and we shall be responsible for the successful completion of the scope of works of M/s…… (Name of the Bidder subsidiary company). **Please accept.**	Please adhere to Bid specifications.
3	Volume V (Forms & Procedures)	FORM-14	**PARENT/ HOLDING COMPANY AGREEMENT** WHEREAS on the Parent/Holding Company's commitment to provide full support for technical and financial requirements and be responsible and liable for successful completion of the works being awarded to M/s……..	We request NHPC to modify this clause as under:- WHEREAS on the Parent/Holding Company's commitment to provide full support for technical and/or financial requirements and be responsible and liable for successful completion of the works being awarded to M/s…….. **Please accept.**	Please adhere to Bid specifications.

Sr. No.	Volume	Clause No.	Original Language	Queries	NHPC Reply
4	Volume V (Forms & Procedures)	FORM-14	**PARENT/ HOLDING COMPANY AGREEMENT** And whereas, in consideration of the aforesaid commitment, the Parent/Holding Company hereby enters into this agreement with the Employer for providing full support for technical and financial requirements to the Contractor and be responsible and liable for successful performance and completion of the works described in the said Contract on the following terms and conditions:	We request NHPC to modify this clause as under:- And whereas, in consideration of the aforesaid commitment, the Parent/Holding Company hereby enters into this agreement with the Employer for providing full support for technical and **/or** financial requirements to the Contractor and be responsible and liable for successful performance and completion of the works described in the said Contract on the following terms and conditions: **Please accept.**	Please adhere to Bid specifications.
5	Volume V (Forms & Procedures)	FORM-14	**PARENT/ HOLDING COMPANY AGREEMENT** 3.(a) The Parent/Holding Company hereby agrees to the Employer to ensure due and faithful performance of the obligations and liabilities by the Contractor under the Contract and remain responsible to irrevocably and unconditionally provide full technical and financial support to the Contractor for completion of the works covered under the Contract.	We request NHPC to modify this clause as under:- The Parent/Holding Company hereby agrees to the Employer to ensure due and faithful performance of the obligations and liabilities by the Contractor under the Contract and remain responsible to irrevocably and unconditionally provide full technical and /or financial support to the Contractor for completion of the works covered under the Contract. **Please accept**	Please adhere to Bid specifications.
6	Volume V (Forms & Procedures)	Form 14	Parent Company Agreement	The liability of the parent company under the parent/holding agreement is not mentioned. We understand the aggregate liability of the parent/holding company and the contractor under the parent/holding agreement shall be read in conjunction with the GCC Clause no. 30 (Limitation of Liability). This has recently been confirmed & clarified by NHPC and other government entities like SJVNL for similar and/or bigger capacity projects. An extract of the reply given by NHPC on this clause in the Teesta-V-GIS tender is attached as per Annexure-A. Please confirm.	Confirmed
7	General		You have provided some drawings of waterways in corrigendum no 2. However, some drawings are still missing which are required to perform the transient analysis for the project. Kindly request you to arrange to provide the drawing listed below. Kindly share all drawing in AutoCAD format. •L section of HRT (from Intake to upstream surge tank) • L section/ cross section of Downstream surge gallery.		pdf files of drawings have already been issued vide earlier corrigendum. Pl refer Annexure-A & B of this informative replies-2

Annexure-A

S.No.	Section Chapter/ Clause	Heading	Pre bid question	Reply of NHPC Ltd.
21of Part-B Informative Replies	Volume-1 Information For Bidder (IFB) / Clause 4 Volume-4 Tender Drawings	Salient Features – Surge Shaft and Surge gallery for downstream water conductor	Please provide below details - Surge shaft orifice diameter and orifice loss coefficients. Also Provide cross section drawing showing these details. - Downstream Surge gallery cross-section drawing. We need above details as the same are Not specified in given Clause and drawings.	During DPR stage Transient conditions have been analysed using the computer programme WHAMO (Water Hammer and Mass Oscillations) developed by US Army corps of Engineers. **For upstream water conductor system** :- Restricted orifice type surge shaft has been provided: - the size of surge shaft is 17 m diameter, the encroachment area has been taken as 19.5 m^2 thus net equivalent area is 207.4 m^2. Orifice area has been taken as 11 m^2. The orifice loss coefficient, (Cd) during upsurge & down surge are considered as 0.84 & 0.97 respectively in the analysis. The drawings no. NHUR-I(II)-3DT1-41-GA-025-00 of surge shaft is attached for reference . **For downstream water conductor system :** The downstream water conductor transient analysis has been carried on WHAMO considering Draft tube having Gate shaft area of 21.1 m^2 up to EL 1237 m & 35.5 m^2 above EL 1237 m for which an opening of 6m x 3.8m below EL. 1237.0m has been provided and an opening of 6.0m x 6.2 m above EL. 1237.0 has been provided. In addition Surge gallery of 7 m ø horse shoe shape & inclined with invert @ EL 1224 m to EL 1264 m in the slope of 1 in 11 and 7 m ø horse shoe shape horizontal gallery of length 260 m with invert @ EL 1233 m has been provided. The drawings no. 1) NHUR-I(II)-4AT1-41-GA-004-00 ,

				2) NHUR-I(II)-4DT1-41-GA-025-00 3) NHUR-I(II)-4CT1-41-GA-044-00 4) NHUR-I(II)-4CT1-41-GA-069-00, 5) NHUR-I(II)-4DT1-41-GA-076-00 are attached as Annexure-B for reference . However in compliance to techno-economic clearance of the project from CEA, the physical and Mathematical Numerical Hydraulic model studies are being carried out. Based on these studies, the arrangement may be updated during the detailed design stage.



NOTES:-

1. ALL DIMENSIONS ARE IN MILIMETERS ; LEVELS, AND GRID ARE IN METRES.
2. THIS DRAWING IS DEVELOPED BASED ON POWER HOUSE AREA SURVEY RECEIVED FROM PID VIDE LETTER NO : NH/CO/PID/2021/443 DATED 10.08.2021 AND ADIT LOCATION VERIFIED BY E-IOM NH/CO/PID/2023/722 DATED 15.11.2023.
3. PRELIMINARY LAYOUT HAS BEEN DEVELOPED UTILIZING AVAILABLE DATA.
4. VARIOUS SIZE AND LEVELS HAS BEEN INCORPORATED IN THE DRAWING WHICH MAY BE MODIFIED DURING DETAILED DESIGN.

LEGEND:-

URI-I STAGE - II

EXISTING URI -I H.E. PROJECT

TENDER DRAWING
NOT FOR CONSTRUCTION

0 30 60 90 120 150 M.

(SCALE 1:3000)

DRG. NO. NHUR-I(II) - 4AT1- 41 - GA - 004 - 00

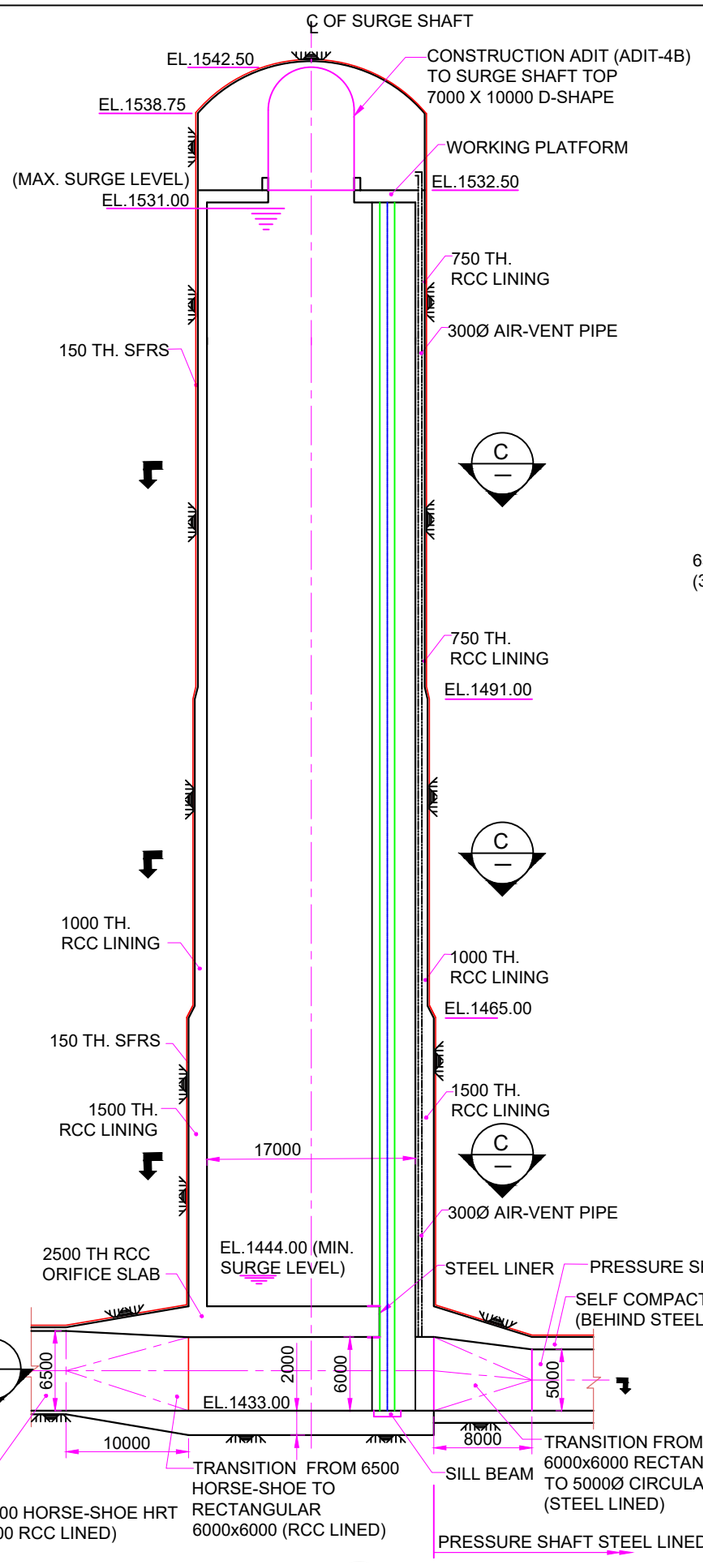
		ISSUED FOR TENDER			
DATE	NO.	REVISION OR ISSUES	BY.	CH.	APP.
DESIGN MEMO NO. डिजाइन मेमो संख्या					

एन एच पी सी लिमिटेड
(भारत सरकार का उद्यम)
NHPC Limited
(A GOVT. OF INDIA ENTERPRISE)

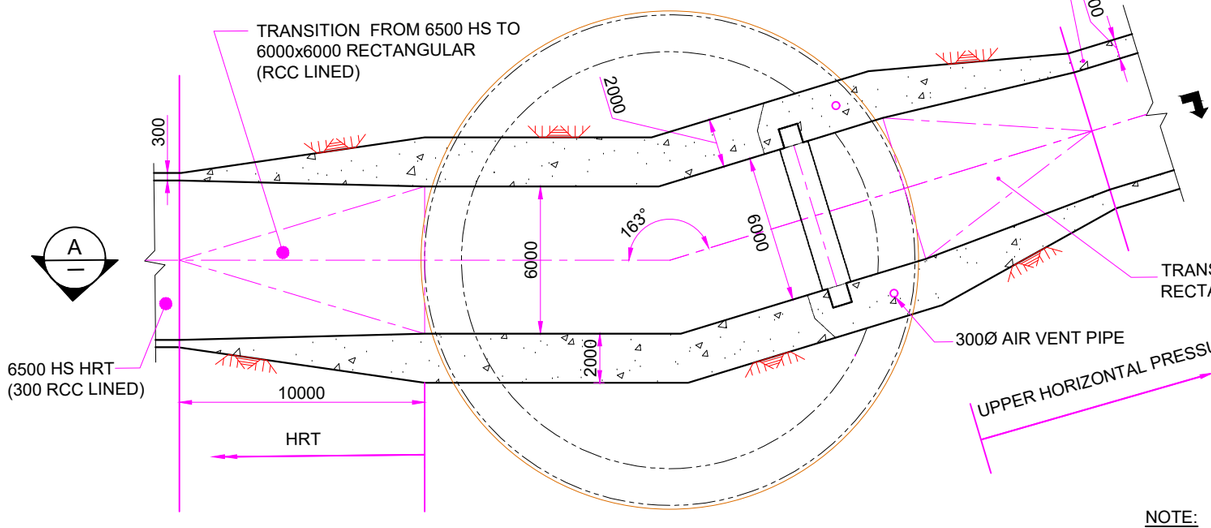
उरी। द्वितीय चरण जल विद्युत परियोजना (जम्मू एण्ड कश्मीर)
URI-I STAGE-II HYDROELECTRIC PROJECT (J&K)

POWER HOUSE AREA GENERAL ARRANGEMENT PLAN

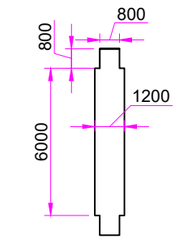
DRAWN उद्रेखित S. TANWAR	SUBMITTED प्रस्तुत VINOD KUMAR	RECOMMENDED अनुशंसित SAKET KUMAR		APPROVED अनुमोदन RAJESH KUMAR				
DATE दिनांक MARCH,2025	DRG. NO. उद्रेख संख्या	NHUR-I(II)	4AT1	41	GA	004	00	



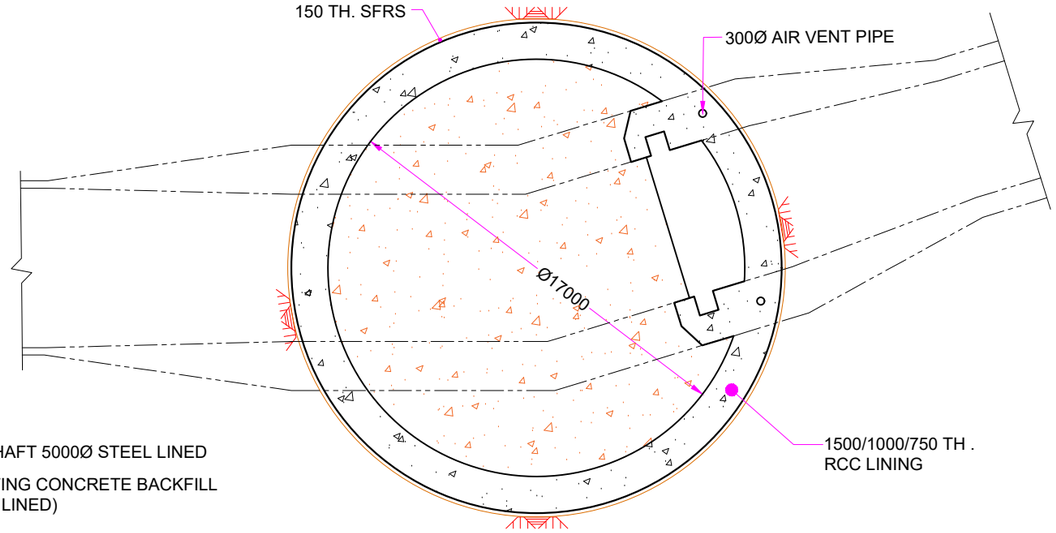
SECTION A
(SCALE 1:250)



SECTION B
(SCALE 1:250)



GATE GROOVE DETAILS
(SCALE 1:250)



SECTION C
(SCALE 1:250)

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETRE AND ELEVATIONS IN METRE.
2. THE GRADE OF CONCRETE SHALL BE M25A40 IN LINING & M15A40 BACKFILL CONCRETE BEHIND STEEL RIBS AND CONFORM TO SECTION B.9 OF TECHNICAL SPECIFICATION.
3. VARIOUS SIZE AND LEVELS HAVE BEEN INCORPORATED IN THE DRAWING WHICH MAY BE MODIFIED DURING DETAILED DESIGN.
4. LOCAL EXCAVATION MAY BE REQUIRED AT CROWN LEVEL TO ACCOMMODATE GATE HOIST.
5. THE BLASTING SHALL BE DESIGNED BY THE CONTRACTOR FOR EXCAVATION OF ALL UNDERGROUND WORKS TO BE PERFORMED AND SHALL BE CONSTANTLY MONITORED CONSIDERING THE SAFETY OF THE EXISTING STRUCTURES OF URI-I H. E. PROJECT.

TENDER DRAWING
NOT FOR CONSTRUCTION

SCALE:

0 5 10 15 20 25 M.

(SCALE 1:500)

		ISSUED FOR TENDER		
DATE	NO.	REVISION OR ISSUES	BY.	CH. APP.
DESIGN MEMO NO. डिज़ाइन मेमो संख्या				

एन एच पी सी लिमिटेड (भारत सरकार का उद्यम)
NHPC Limited (A GOVT. OF INDIA ENTERPRISE)
A Navratna Company

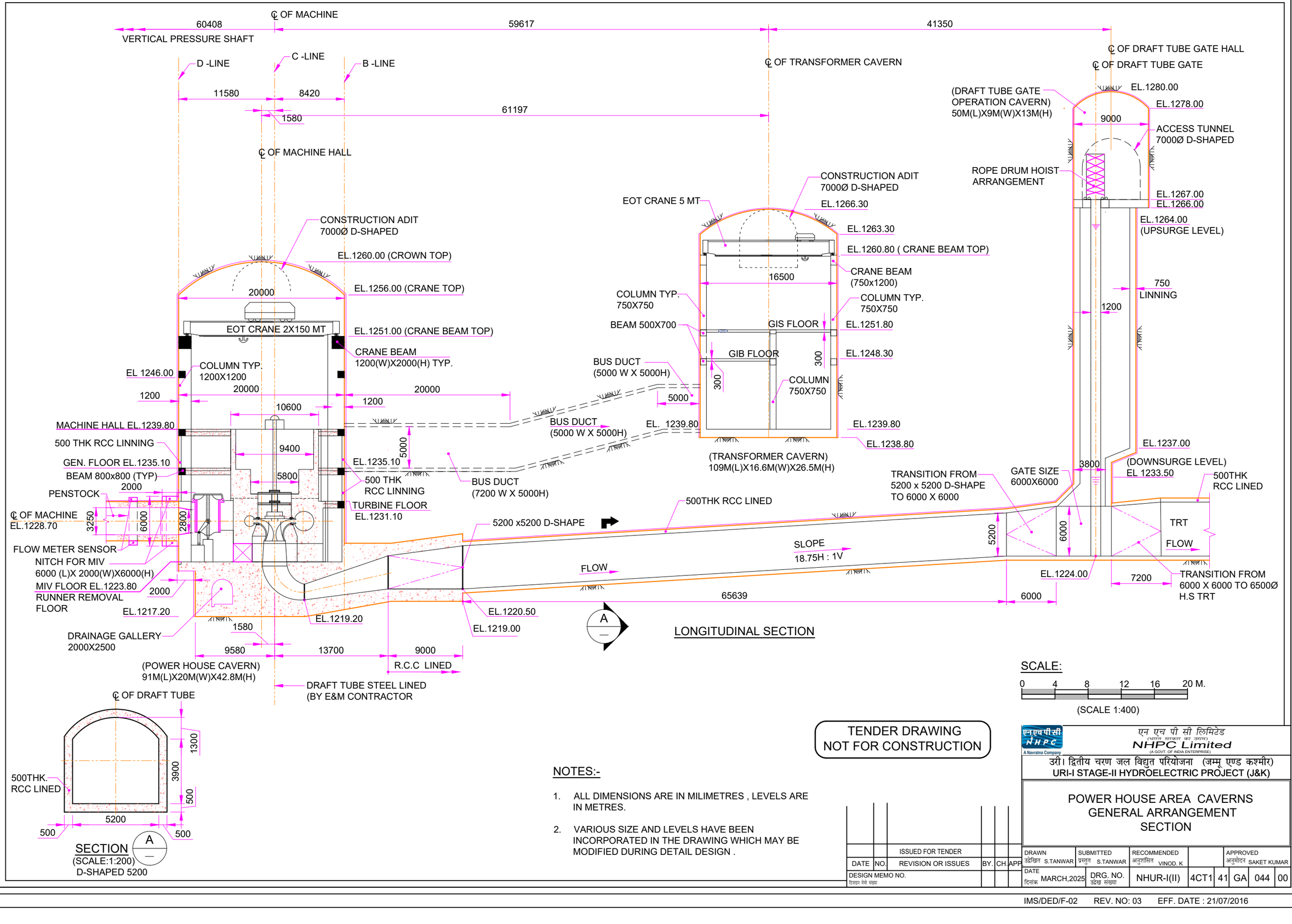
उरी। द्वितीय चरण जल विद्युत परियोजना (जम्मू एण्ड कश्मीर)
URI-I STAGE-II HYDROELECTRIC PROJECT (J&K)

SURGE SHAFT
CONCRETE
PLAN & SECTIONS

DRAWN उद्रेखित	SUBMITTED प्रस्तुत	RECOMMENDED अनुशंसित		APPROVED अनुमोदन
ASLAM . A	ASLAM . A	VINOD. K		SAKET KUMAR

DATE दिनांक	DRG. NO. उद्रेख संख्या					
MARCH,2025	NHUR-I(II)	3DT1	41	GA	025	00

DRG. NO. NHUR-I(II) 3DT1 41 GA 025 00



LONGITUDINAL SECTION

℄ OF DRAFT TUBE

SECTION A — A
(SCALE:1:200)
D-SHAPED 5200

SCALE:

0 4 8 12 16 20 M.

(SCALE 1:400)

TENDER DRAWING
NOT FOR CONSTRUCTION

NOTES:-

1. ALL DIMENSIONS ARE IN MILIMETRES , LEVELS ARE IN METRES.
2. VARIOUS SIZE AND LEVELS HAVE BEEN INCORPORATED IN THE DRAWING WHICH MAY BE MODIFIED DURING DETAIL DESIGN .

		ISSUED FOR TENDER			
DATE	NO.	REVISION OR ISSUES	BY.	CH.	APP.
DESIGN MEMO NO. दिशादर्श मेमो संख्या					

एन एच पी सी लिमिटेड (भारत सरकार का उद्यम)
NHPC Limited (A GOVT. OF INDIA ENTERPRISE)
A Navratna Company

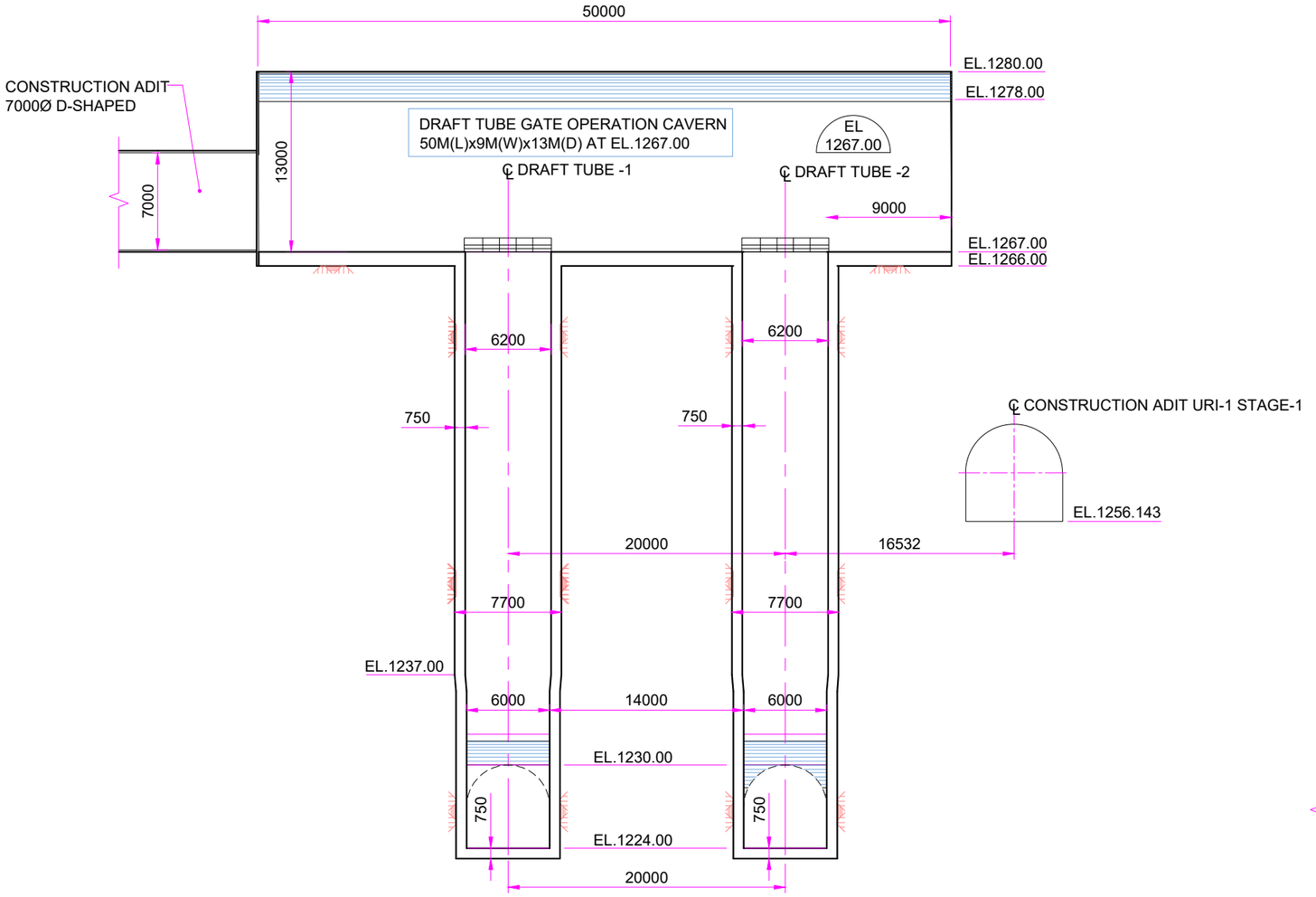
उरी। द्वितीय चरण जल विद्युत परियोजना (जम्मू एण्ड कश्मीर)
URI-I STAGE-II HYDROELECTRIC PROJECT (J&K)

POWER HOUSE AREA CAVERNS
GENERAL ARRANGEMENT
SECTION

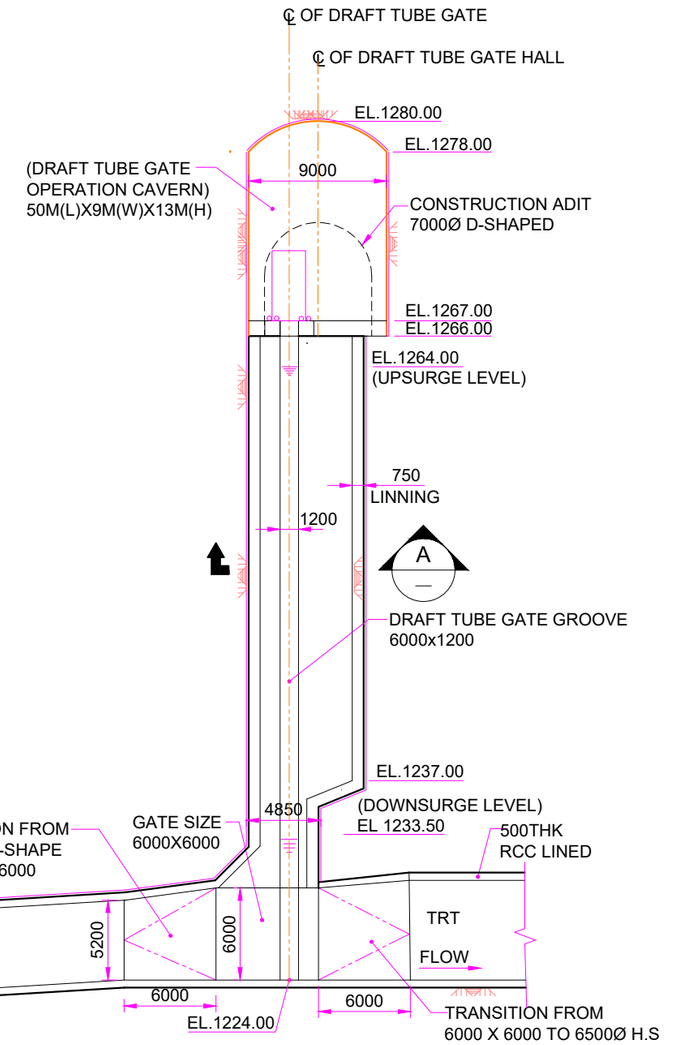
DRAWN उद्रेखित	SUBMITTED प्रस्तुत	RECOMMENDED अनुशंसित		APPROVED अनुमोदन
S.TANWAR	S.TANWAR	VINOD. K		SAKET KUMAR

DATE दिनांक	DRG. NO. उद्रेख संख्या					
MARCH,2025	NHUR-I(II)	4CT1	41	GA	044	00

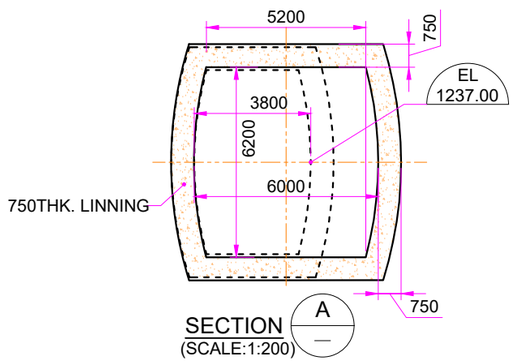
DRG. NO. NHUR-I(II) -4CT1 - 41 - GA - 044 - 00



LONGITUDINAL SECTION THROUGH
CENTER LINE OF DRAFT TUBE GATE OPERATION CAVERN



CROSS- SECTION THROUGH
CENTER LINE OF DRAFT TUBE GATE



SECTION
(SCALE:1:200)

0 4 8 12 16 20 M.
(SCALE 1:400)

NOTES:-

1. ALL DIMENSIONS ARE IN MILIMETERS ; LEVELS, AND GRID ARE IN METRES.
2. VARIOUS SIZE AND LEVELS HAS BEEN INCORPORATED IN THE DRAWING WHICH MAY BE MODIFIED DURING DETAILED DESIGN.
3. THE BLASTING SHALL BE DESIGNED BY THE CONTRACTOR FOR EXCAVATION OF ALL UNDERGROUND WORKS TO BE PERFORMED AND SHALL BE CONSTANTLY MONITORED CONSIDERING THE SAFETY OF THE EXISTING STRUCTURES OF URI-I H.E. PROJECT.

TENDER DRAWING
NOT FOR CONSTRUCTION

एन एच पी सी लिमिटेड
(भारत सरकार का उपक्रम)
NHPC Limited
(A GOVT. OF INDIA ENTERPRISE)

उरी। द्वितीय चरण जल विद्युत परियोजना (जम्मू एण्ड कश्मीर)
URI-I STAGE-II HYDROELECTRIC PROJECT (J&K)

DRAFT TUBE
GATE OPERATION CHABMER
SECTIONS

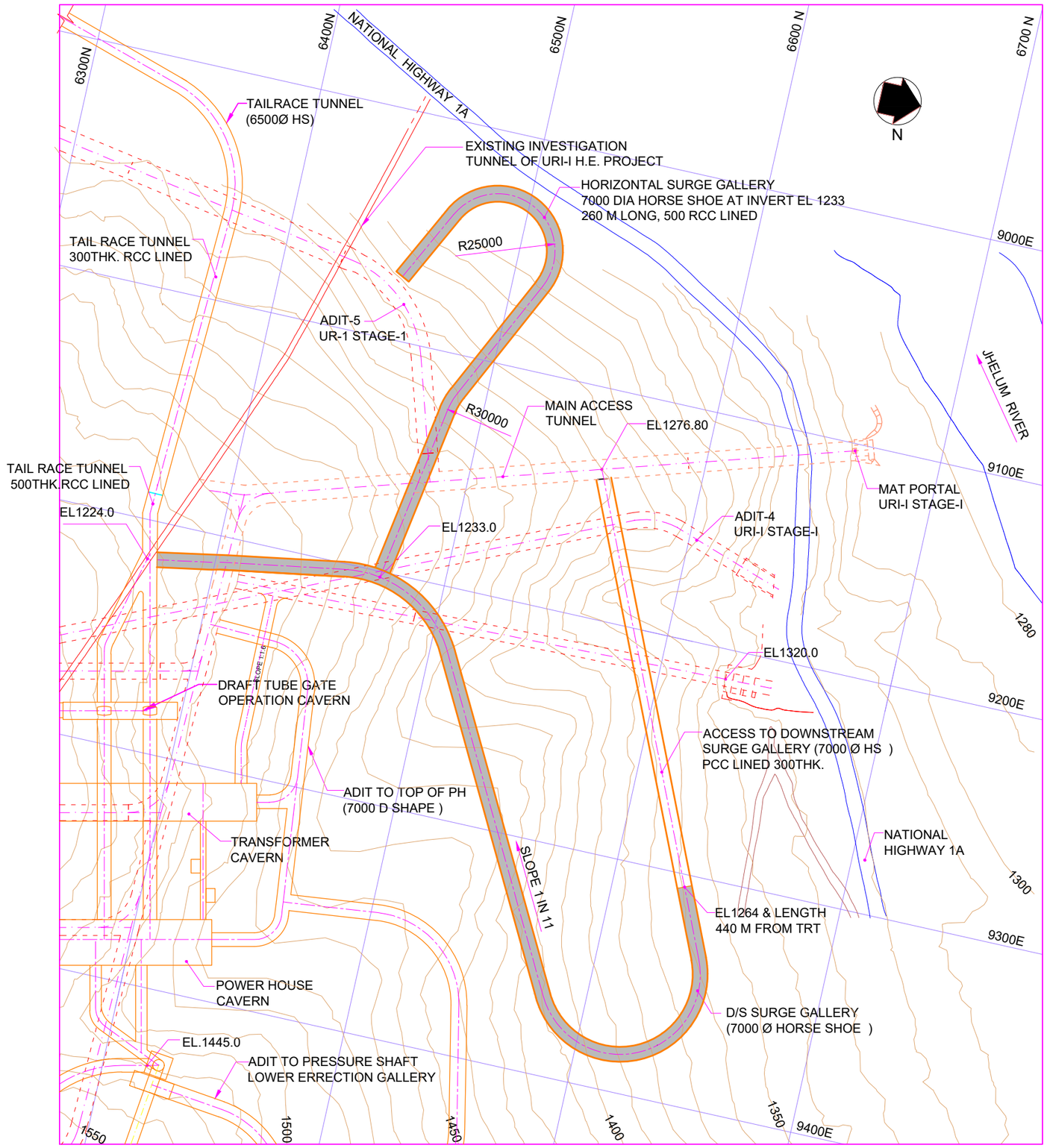
DATE	NO.	REVISION OR ISSUES	BY.	CH.	APP.
		ISSUED FOR TENDER			

DESIGN MEMO NO. डिजाइन मेमो संख्या

DRAWN उद्रेखित	SUBMITTED प्रस्तुत	RECOMMENDED अनुशंसित		APPROVED अनुमोदन
S.TANWAR	S.TANWAR	VINOD. K		SAKET KUMAR

DATE दिनांक	DRG. NO. उद्रेख संख्या					
MARCH,2025	NHUR-I(II)	4CT1	41	GA	69	00

DRG. NO. NHUR-I(II) -4CT1 - 41 - GA - 069 - 00



NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS AND GRIDS ARE IN METRES.
2. THIS DRAWING IS DEVELOPED BASED ON POWER HOUSE AREA SURVEY RECEIVED FROM PID VIDE LETTER NO : NH/CO/PID/2021/443 DATED 10.08.2021 AND ADIT LOCATION VERIFIED BY PID VIDE E-IOM NH/CO/PID/2023/722 DATED 15.11.2023.
3. THE BLASTING SHALL BE DESIGNED BY THE CONTRACTOR FOR EXCAVATION OF ALL UNDERGROUND WORKS TO BE PERFORMED AND SHALL BE CONSTANTLY MONITORED CONSIDERING THE SAFETY OF THE EXISTING STRUCTURES OF URI-I H.E. PROJECT.

LEGEND:-

URI-I STAGE - II

EXISTING URI-I H.E. PROJECT

TENDER DRAWING
NOT FOR CONSTRUCTION

0 20 40 60 80 100 M.

(SCALE 1:2000)

एन एच पी सी लिमिटेड
(भारत सरकार का उद्यम)
NHPC Limited
(A GOVT. OF INDIA ENTERPRISE)

उरी। द्वितीय चरण जल विद्युत परियोजना (जम्मू एण्ड कश्मीर)
URI-I STAGE-II HYDROELECTRIC PROJECT (J&K)

POWER HOUSE AREA
TAIL RACE SURGE GALLERY
GENERAL ARRANGEMENT- PLAN

DATE	NO.	REVISION OR ISSUES	BY.	CH.	APP.
		ISSUED FOR TENDER			

DESIGN MEMO NO. डिजाइन मेमो संख्या

DRAWN उद्रेखित	SUBMITTED प्रस्तुत	RECOMMENDED अनुशंसित		APPROVED अनुमोदन
S.TANWAR	S.TANWAR	VINOD. K		SAKET KUMAR

DATE दिनांक	DRG. NO. उद्रेख संख्या					
MARCH,2025	NHUR-I(II)	4DT1	41	GA	076	00

DRG. NO. NHUR-I(II) -4DT1 - 41 - GA - 076 - 00