

Clause No.	TECHNICAL REQUIREMENTS	
SUB SECTION – GENERAL		
1.00.00	INTENT OF SPECIFICATION	
1.01.00	This specification intends to cover the following activities, services and works on Unit rate basis in respect of Switchyard Extension Package at Rihand Super Thermal Power Project-III situated in the state of Uttar Pradesh, India: ~~a) Complete design and engineering of all the systems, sub-systems, equipment, material and services.~~ ~~b) Providing engineering data, drawings and O&M manuals for Employer's review, approval and records.~~ ~~c) Manufacturing, supply, testing, packing, transportation and insurance from the manufacturer's work to the site including port and customs clearance, if required.~~ d) Receipt, storage, insurance, preservation and conservation of equipment at the site. ~~e) All civil works as required.~~ f) Fabrication, pre-assembly (if any), erection, testing and putting into satisfactory operation of all the equipment/material including successful commissioning. ~~g) Furnishing of spares on FOR site basis.~~ ~~h) Reconciliation with customs authorities, in case of foreign supplies.~~ i) Satisfactory conclusion of the contract. Detailed scope of work under this package is listed at clause 3.00.00.	
1.02.00	In addition to the requirements indicated in this section (Technical specifications), all the requirements as stated in other sections shall also be considered as a part of this specification as if completely bound herewith.	
1.03.00	The Bidder shall be responsible for providing all ~~material, equipment and services~~ specified or otherwise which are required to fulfill the intent of ensuring operability, maintainability ~~and the reliability~~ of the complete work covered under this specification.	
1.04.00	~~It is not the intent to specify all aspects of design and construction of equipment mentioned herein. The systems, sub-systems and equipment shall conform in all respect to high standards of engineering, design and workmanship, and shall be capable of performing in continuous commercial operation.~~	
1.05.00	~~Whenever a material or article is specified or described by the name of a particular brand, manufacturer or trade mark, the specific item shall be understood as establishing type, function and quality desired. Products of other manufacturers may~~	
RIHAND STPP-III SWITCHYARD EXTN. PKG.		BID DOC NO. CS-1240-572D-2
TECHNICAL SPECIFICATIONS		PART-I SECTION-VI
		Page G-1/48

Clause No.	TECHNICAL REQUIREMENTS	
	~~also be considered, provided sufficient information is furnished so as to enable the Employer to determine that the products are equivalent to those named.~~	
1.06.00	~~Bidder is requested to carefully examine and understand the specifications and seek clarifications, if required, to ensure that they have understood the specifications. Such clarifications should be sought at least 15 days before the scheduled date of the opening of the bids. The bid should not include any sections like clarifications, interpretations and/or assumptions. If the Bidder feels that, in his opinion, certain features brought out in his offer are superior to what has been specified, these may be highlighted separately.~~	
1.07.00	~~The Bidder may also make alternative offers provided such offers are superior in his opinion, in which case adequate technical information, operational feed back, etc., shall be submitted with the offer to enable the Employer to assess the superiority and reliability of the alternative offered. For each alternative offer, its implications on the performance, guaranteed efficiency, auxiliary power consumption, etc. shall be clearly brought out in the bid for the Employer to make an overall assessment. In any case, the base offer shall necessarily be in line with specifications. Under no circumstances the specified equipment etc., shall be brought out as an alternative.~~	
1.08.00	Any deviation or variation from the scope requirement and/or intent of this specification shall be clearly mentioned under Deviation Schedule of the Bid Proposal Sheets irrespective of the fact that such deviations/variations may be standard practice or a possible interpretation of the specification by the Bidder. Except for the deviations/variations which are accepted by the Employer before the award of the contract, it will be the responsibility of the Bidder to fully meet the intent and the requirements of the specification within the quoted price. No other departure from the specification except for the declared deviation indicated by the Bidder in his proposal shall be considered. The interpretation of the Employer in respect of the scope, details and services to be performed by the Bidder shall be binding, unless specifically clarified otherwise by the Employer in writing before the award of contract.	
1.09.00	The drawings enclosed as per Annexure-2 to this section and forming a part of the specification shall supplement the requirements specified herein. The scope and terminal points for the equipment to be furnished under this contract are also identified in these drawings and are to be read in conjunction with the text of the specifications. These are preliminary drawings for bidding purpose only and are subject to changes that may be necessary during detailed engineering after award keeping the basic parameters as specified.	
1.10.00	~~Failure of any equipment to meet the specified requirements of tests carried out at works or at site shall be sufficient cause for rejection of the equipment. Rejection of any equipment will not be held as a valid reason for delay in the completion of the~~	
RIHAND STPP-III SWITCHYARD EXTN. PKG.		BID DOC NO. CS-1240-572D-2
TECHNICAL SPECIFICATIONS		PART-I SECTION-VI
		Page G-2/48

Clause No.	TECHNICAL REQUIREMENTS	
	works as per schedule. Contractor shall be responsible for removing all deficiencies, and supplying the equipment that meet the requirement.	
2.00.00	PROJECT INFORMATION	
2.01.00	'Project Synopsis' and other details about Rihand STPP are enclosed at Annexure-I.	
2.02.00	~~The criteria for wind resistance design of structure and equipment is enclosed at Appendix-I of Annexure-I.~~	
2.03.00	~~Criteria for earthquake resistant design of structures and equipment is enclosed at Appendix-II of Annexure-I.~~	
2.04.00	The meteorological data of Rihand is enclosed at Appendix-III of Annexure-I.	
3.00.00	SCOPE OF WORK	
3.01.01	The scope of work comprises of execution of 400 & 132 kV Switchyard extension works at Rihand STPP. The 400kV switchyard is of one and half breaker scheme and 132 kV switchyard is of double bus scheme. The scope of work shall comprise, but not limited to the design, engineering, manufacture, testing and inspection at manufacturer's works, packing, supply, transportation, transit insurance, delivery to site, unloading, storage and equipment erection including associated civil and structural works. Further it shall include the cabling, lighting, lightning protection, earthing, association of sub vendors if any in the erection, supervision, site testing, inspection and commissioning of 400 kV & 132 kV switchyard extension portion. <u>Bay Details</u> (As indicated in Single Line Diagram): The various bays envisaged under this package are as follows: (i) Execution of following bays at existing 400 kV Switchyard (with one and half breaker scheme): • 1 no. of Inter Bus Transformer bay • 1 no. of Bus reactor alongwith its bay components (ii) Execution of following bays at existing 132 kV switchyard (with double bus scheme): • 1 no. of Inter Bus Transformer bay	
RIHAND STPP-III SWITCHYARD EXTN. PKG.		BID DOC NO. CS-1240-572D-2
TECHNICAL SPECIFICATIONS		PART-I SECTION-VI
		Page G-3/48

Clause No.	TECHNICAL REQUIREMENTS	
3.01.02	~~This scope covers all the work required for detailed soil investigation. It shall include mobilization of necessary equipment, providing necessary engineering supervision and technical personnel, carrying out field investigation and tests, laboratory tests, analysis and interpretation of data and results, collecting data regarding geographical conditions from local sources, giving flood details of the area (past history), preparations for the type of foundations and the safe bearing capacity for different sizes of foundations, different founding strata for the various locations along the transmission lines. In addition the soil investigation may be required to be carried at other locations.~~	
3.01.03	~~The weed growth/ tree cutting shall be responsibility of the Contractor. The contractor shall count, mark and put proper numbers with suitable quality of paint on all the trees that are to be cut, cost of the same shall be included in the bid price. Contractor may note that Employer shall not pay any compensation for any loss or damage to the properties or for tree cutting due to contractor's work. However the approval for the same shall be obtained by Owner.~~	
3.01.04	~~The equipment and materials to be supplied by the Contractor shall form a complete 400kV & 132kV switchyards. The equipment and services as detailed in all sections of the bidding documents and as shown on the tender drawings shall be within the scope of supply of the Contractor.~~	
3.02.00	The following is the list of items under the scope of contractor. However any items though not specifically mentioned but which are required to make the switchyard complete in all respects for its safe, efficient, reliable and trouble free operation shall be supplied and erected by the Contractor, unless they are specifically excluded in the text of exclusions given in Clause-3.05.00 of this section. - 400kV & 132kV equipments: Circuit Breakers, Isolators (with/without earth switches), Current Transformers, Surge arresters, Bus post insulators and Capacitor voltage transformers. - 420kV 3 ph. 80 MVar Bus Reactor alongwith its civil works - 400kV & 132kV Switchyard Civil Works - Civil works associated with 400/132 kV IBT - Civil and structural works associated with 132 kV cable sealing ends - 400kV & 132kV Switchyard materials: - 4" EHIPS Aluminum tube - ACSR 'Moose' Conductor - 10.98 dia G.S. Earthwire - Insulator string and hardware	
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS
PART-I SECTION-VI	Page G-4/48	

Clause No.	TECHNICAL REQUIREMENTS			
	- Clamps, connectors and spacers - Bay Marshalling kiosks - ~~Complete earthing grid (inclusive of supply of 40mm dia MS rod and GI flat) earthing of all switchyard equipments and direct stroke lightning protection system and its connection to earthing grid.~~ - ~~Executing complete earthmat grid (as required) for 400 kV & 132 kV switchyard with spacing adopted in line with existing spacing and risers as required for equipment/structure earthing.~~ - Direct Stroke Lightning Protection of 400 kV switchyard either through LM or through Shield wire based on detail engineering. - Power & Control cables and screen cables, cabling (including interpole and interpanel), Cabling between Contractor and Employer supplied equipment, cable support angles, cable trays and accessories necessary for cable erection such as glands, lugs, clamps for cables, ferrules, cable ties, hume pipe etc. cable route markers for buried cable trench are also included in the scope. - ~~Power & Control cable schedule & termination schedules shall be prepared by the Contractor.~~ - Outdoor lighting system for 400/132 kV switchyards. - BCU and BPU for all the bays including Disturbance Recorder. Standalone Event logger and Time synchronizing equipment for bays under present scope and owners use as well. - ~~Modification in the existing control and protection scheme including supply of hardware/ software for integration of bays under present scope with the existing system like bus bar protection, islanding system etc.~~ - Interfacing with the existing RTU for extending the data from bays under present scope to RLDC. - ~~Relay setting calculations shall be prepared by the Contractor and approved by Employer.~~ - All LT cabling works associated with existing LT switchgear, 400/132 kV IBT, Bus reactor and other switchyard equipments etc. - Automatic start/ stop type centrifugal pump for sump pit.			
3.03.00	Services and Items The scope also include but not limited to the following services/items described herein and elsewhere in specification:			
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-I SECTION-VI	Page G-5/48

Clause No.	TECHNICAL REQUIREMENTS			
	a) ~~System design and engineering~~ b) ~~Supply of equipment and material~~ c) ~~Civil works~~ d) ~~Structural works~~ e) ~~Erection works~~ f) ~~Project management and site supervision~~ g) ~~Testing and commissioning~~ h) ~~Interface coordination~~ i) ~~Performance testing~~ j) ~~Clearance from statutory authority. Owner shall provide support for this activity.~~			
3.03.01	~~System Design and Engineering~~ a) ~~The Contractor shall be responsible for detailed design and engineering of overall system, sub-systems, elements, system facilities, equipments, auxiliary services, etc. It shall include proper definition and execution of all interfaces with systems, equipment, material and services of Employer for proper and correct design, performance and operation of the project.~~ b) ~~Contractor shall provide complete engineering data, drawings, reports, manuals, etc. for Employer's review, approval and records.~~ c) ~~The scope shall also include the design and engineering as per details elaborated elsewhere in this specification.~~ d) ~~For all structural works, the Contractor shall prepare design and fabrication drawings. Similarly for civil works, the detailed construction drawings shall be prepared for those items whose design is to be done by the Contractor.~~			
3.03.02	~~Supply of Equipment and Material~~ a) ~~The Contractor shall be responsible for design, engineering, manufacture, testing, inspection at manufacturer's works, supply, transportation, insurance, delivery at site, unloading, storage, in plant transportation at site, complete erection & supervision, site testing & inspection, and successful commissioning of all the equipment and material as detailed elsewhere in specification and as shown on the tender drawings. Any item though not specifically mentioned, but is required to complete the project works in all respects for its safe, reliable, efficient and trouble free operation shall be supplied and erected by the Contractor unless it is explicitly excluded as given in clause 3.05.00 below.~~			
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-I SECTION-VI	Page G-6/48

Clause No.	TECHNICAL REQUIREMENTS				
3.03.03	b) ~~All consumables, wastages and damages shall be to the account of Contractor.~~				
	Civil & Structural Works The scope of civil works shall include design, engineering & construction of all civil, structural and architectural works including supply of all materials complete for all equipments, gantry structures and associated facilities for the switchyard package. The nature of work generally involves earthwork in excavation and filling in all types of soils, dressing to the required profile, dewatering till the structures are constructed/erected up to required level or as directed by the engineer, shoring, backfilling around completed structures and plinth filling, disposal of surplus earth, concreting including reinforcement and formwork, fabrication and erection of all structural steel and miscellaneous steel (i.e. cable/pipe supports, ladders, railings, inserts, embedments, gratings, chequered plate covers, platforms, anchor bolts, etc.), rail track for movement of shunt reactor, fabrication, galvanising, Proto-assembly & erection of Gantry Structure, Lighting Mast & Equipment supporting structure, R.C.C. cable trench & precast covers, cable ducts / duct banks, soil sterilisation / anti-weed treatment, gravel filling, drainage, fencing, gates, final grading, supplying and laying earthing mat and any other work required for completion and proper functioning of the switchyard All material including cement, reinforcement steel and structural steel required for completion of the work covered under this package are in the scope of the bidder. The scope of work described below is general in nature. The Bidder shall provide all structures / facilities required for the effective functioning of switchyard of the power plant, whether or not they are specifically mentioned. The scope of Bidder for civil, structural and architectural works shall include but not limited to the following: a) Detailed design criteria including basis of design shall be prepared by the Bidder based on various requirements specified elsewhere in the specifications. All the above documents shall be finalised after Owner's approval and the same shall form the basis of Detailed Engineering Work. b) Civil and structural works associated with switchyard and Lighting Mast including proto assembly and substructure as required complete. c) Civil and structural works associated with switchyard and cable sealing ends including substructure as required complete. d) Civil and structural works associated with foundations for One (1) number of 80 MVAR Bus Reactor and one (1) number of 400/132 kV IBT including oil pit, stone filling, laying and fixing of rails for movement of				
RIHAND STPP-III SWITCHYARD EXTN. PKG.		BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-I SECTION-VI	Page G-7/48

Clause No.	TECHNICAL REQUIREMENTS			
	Transformers/reactors, rail track and jacking pad as required, arrangement for cabling etc. all complete. e) All necessary embedments, inserts, supporting structures, supporting members as per requirement. All cable tray supporting structures including angles/bends/insert plates etc. inside control room building are also in scope of bidder. f) All pipe and cable supporting arrangement/structures, pipe and cable trenches etc. g) All culverts (i.e. box culverts/ pipe culverts/ duct-banks) at the crossing of cable trenches/drains with roads, railway lines and drains, etc. as required. h) Supply of all materials for the construction of structures / facilities in the switchyard package. Bidder has to make arrangements for supply of all materials. Employer will not supply any material to the Bidder. i) Storm water drainage system for switchyard area and connecting to the Employer's nearby storm water drains along road side. j) Single lane WBM road with black top road in switchyard and connecting to the Employer's road. k) Site Preparation, soil sterilization /anti-weed treatment including gravel filling but excluding major levelling. l) Fencing along with gates for switchyard area m) Disposal of surplus excavated soil up to a lead of 5.0 km as directed by the Engineer. n) Any other facility / structure that would be required as per system requirements. o) All protection measures to prevent any damage to the adjoining structures / facilities. p) Scope of the Bidder shall also include supply and laying of 40mm dia MS Rods as earthing mat as per requirement. q) Geotechnical investigation for switchyard area is not in the scope of the Bidder and the soil data to be considered shall be as per Chapter-C1 "Foundation System and Geotechnical data".			
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-I SECTION-VI	Page G-8/48

Clause No.	TECHNICAL REQUIREMENTS	
3.03.04	r) ~~Bidder to note that foundation for 80 MVar Bus reactor is located on sloping ground varying from RL (+) 278.6 M to RL (+) 275.0 M etc. (Refer tender drg. no. 1240-572D-POE-A-002, '400 kV switchyard layout and section'). RCC retaining wall around the soil pit to protect the soil in the sloping portion is also in the scope of the Bidder.~~	
	~~All works relating to design, preparation of drawings including fabrication drawings, procurement of material, fabrication, proto-assembly, mass fabrication, transportation to site, handling, storage and erection of all Towers & Beams, Lighting Mast and Equipment supporting structures (both lattice type and pipe type) for the switchyard as per design and drawings to be prepared by the Contractor and approved by the Owner. This shall also include all types of bolts, nuts, hangers, shackles, clamps, step bolts etc. and any other items those are required to complete the job.~~	
	~~The Contractor shall construct, erect and install all structures, equipments and material of switchyard covered under the project. He shall be responsible for provision of all labour, tools and plant, and supervisory staff for safe, reliable, proper and correct erection of project components.~~	
	~~The tools and plant shall include, but not limited to, special hoisting equipment, cranes, stringing equipment, slings, consumables and all other articles and supplies as required.~~	
	~~The Contractor shall ensure periodic cleaning of work sites and removal of all waste material, packing material, surplus earth and left-overs and their proper disposal.~~	
	Construction Facility	
	The following are also in the Bidder's scope of work pertaining to construction facilities for the project.	
	a) ~~Development of Bidder's temporary staff colony and labour colony along with fencing etc. wherever required.~~	
	b) Bidder's temporary construction office, construction stores (open/ covered), workshops, material/ field testing laboratory and any other temporary building and construction equipment, labour and materials.	
	c) All necessary fire fighting devices/ equipment/ fire tender etc. required for safety purpose during the project execution stage.	
	d) All tools and tackles required for the work.	
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS
		PART-I SECTION-VI
		Page G-9/48

Clause No.	TECHNICAL REQUIREMENTS				
3.03.05	e) Bidder shall arrange skilled/ semiskilled/ unskilled labour from local sources as far as available in this country and supervisory staff for quality execution. ~~of all civil, structural and architectural works.~~				
	f) Construction water The contractor shall arrange for construction water, service water and also potable water for labour and other personnel at the worksite/ colony from underground source. The quality of water should meet the requirements, for which it is proposed to be used. ~~All Civil and Structural work associated with the above including borings, pipe lines, valves, pumps, tube wells, pump house, underground storage tank, over ground storage tank, water tankers etc, whatsoever required for taking the water from the underground source to the site of work shall be provided/ erected/ constructed/ maintained by the contractor at his own cost.~~ The Contractor shall not be entitled to any compensation on account of the expenditure incurred in arranging the construction water.				
	g) Construction Power Construction power shall be provided by the Owner as per the provision of General conditions/ Special conditions of contract for works to be executed within the plant boundary. For works to be executed outside the plant boundary, power for the construction purposes shall be arranged by the contractor at his own cost.				
	~~Scope of supply shall also include:~~				
	a) Access such as stairs. b) All steel inserts, plates, bolts, nuts, sleeves etc. to be grouted in concrete work and used to hold / support the equipment / system being supplied and erected under this specifications.				
3.03.06	~~Scope of Services:~~ a) Any additional civil works, materials and services, which though not specially mentioned but are required to make the system complete. b) Drawing, data sheets, design calculations and erection operation for complete system. ~~As built drawing for all structures and layout.~~				
RIHAND STPP-III SWITCHYARD EXTN. PKG.		BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-I SECTION-VI	Page G-10/48

Clause No.	TECHNICAL REQUIREMENTS			
3.03.07	Erection Works a) The Contractor shall construct, erect and install all equipment and material of switchyards covered under the project. He shall be responsible for provision of all labour, tools and plant, and supervisory staff for safe, reliable, proper and correct erection of project components. b) The tools and plant shall include, but not limited to, special hoisting equipment, cranes, stringing equipment, slings, consumables and all other articles and supplies as required. c) The Contractor shall ensure periodic cleaning of work sites and removal of all waste material, packing material, surplus earth and left-over and their proper disposal. d) <u>As the work is to be carried out in an existing charged switchyard, the contractor has to employ suitable manpower and supervision personnel. The contractor is solely and fully responsible for the safety of personnel and material. Any damage to existing equipments shall be made good by the contractor as directed by the engineer-in-charge at no extra cost to the Owner. The contractor shall coordinate with site personnel for arranging shut down for interconnections with the existing system.</u>			
3.03.08	Project Management and Site Supervision a) The Contractor shall be responsible for the overall management and supervision of works. He shall provide experienced, skilled, knowledgeable and competent personnel for all phases of the project, so as to provide the Employer with a high quality system. ~~b) The Contractor shall be responsible for training of Employer's operation and maintenance personnel as to be able to operate & maintain the project and its components properly, safely and efficiently over long period of time.~~ ~~c) The Contractor's supervisory personnel shall provide operation and maintenance assistance during the warranty period.~~ ~~d) A project execution schedule called Master Network (MNW) in the form of PERT chart/network and based on 'Work break down structure' shall be prepared by the Contractor for Employer's approval. The MNW shall identify milestones of key events for each work/component in the areas of engineering, procurement, manufacture, dispatch, erection and commissioning. It shall also indicate interfaces and inputs required to be given by Employer.~~			
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-I SECTION-VI	Page G-11/48

Clause No.	TECHNICAL REQUIREMENTS	
3.03.09	Testing and Commissioning a) The scope includes testing and commissioning of all equipment, sub-systems and systems of the project and putting them into successful commercial operation. The scope shall include but not limited to the requirements given elsewhere in the specification. b) The Contractor shall be responsible to provide all necessary testing and commissioning personnel, tools and plant, test equipment, etc.	
3.03.10	Interface Coordination a) The Contractor shall identify all interface issues with Employer and other agencies, and shall be responsible for such interfacing, coordination and exchange of all necessary information. b) ~~The Contractor shall submit to the Employer all drawings for review. He shall list the detailed requirements of interface between Contractor's work and the material and services to be supplied by Employer.~~	
3.04.00	Terminal Points The Contractor shall be responsible for making all connections at terminal points, ~~and shall supply necessary jointing material, connectors, nuts, bolts, etc.~~ The following are the project terminal points for the purposes of the scope of this contract as indicated in the single line diagram:	
3.04.01	<u>For 400kV Switchyard:</u> a) 400 kV bushings of Employer's 400/132kV, Inter Bus Transformer b) Existing 400 kV Bus Isolators	
3.04.02	<u>For 132kV Switchyard:</u> a) 132 kV bushings of Employer's 400/132kV, Inter Bus Transformer b) Existing 132 kV Busbars	
3.04.03	<u>Other Terminations:</u> a) Existing C&R panels/ Bay MK/LT Switchgear	
RIHAND STPP-III SWITCHYARD EXTN. PKG.		BID DOC NO. CS-1240-572D-2
TECHNICAL SPECIFICATIONS		PART-I SECTION-VI
		Page G-12/48

Clause No.	TECHNICAL REQUIREMENTS	
3.05.00	Exclusions The following are excluded from the scope of Contractor under this contract: a) Supply, erection and commissioning of Inter Bus Transformer b) Fire protection for IBT and Bus Reactor c) 132 kV cable and cable sealing ends d) LT Switchgear e) 220 V and 48 V Battery and Battery Chargers	
3.06.00	Inputs by Employer a) Legally cleared and generally leveled land with approach road. b) The Construction power supply (415 V, 3phase, AC Supply) will be made available at one point.	
3.07.00	Arrangement by the Contractor Contractor shall make his own necessary arrangements for the following and for those not listed anywhere else: a) Extension of construction power supply at all work areas b) Construction and potable water c) Construction office and store (open & covered) d) Construction workshop and material/field testing laboratory e) Boarding & lodging arrangement for their personnel f) Fire protection and security arrangements during construction stage	
~~4.00.00~~	SPARES	
~~4.01.00~~	All spares supplied under this contract shall be strictly interchangeable with the parts for which they are intended for replacement. The spares shall be treated and packed for long term storage in the climatic conditions prevailing at the site. Small items shall be packed in sealed transparent plastic covers with desiccant bags as necessary.	
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS
PART-I SECTION-VI	Page G-13/48	

Clause No.	TECHNICAL REQUIREMENTS	
4.02.00	~~Each spare part shall be clearly marked and labeled on the outside of the packing together with the description when more than one spare part is packed in single case. A general description of the contents shall be shown on outside of the case and detailed list enclosed. All cases, containers and other packages must be suitably marked and numbered for the purpose of identification.~~	
4.03.00	~~Commissioning spares: The Bidder shall include in his scope of supply all commissioning spares. List of such spares along with the quantities shall be indicated in the bid.~~	
4.03.01	~~The Contractor shall supply spares which he expects to consume during installation testing and commissioning of system. The quantity of these spares shall be decided based on his previous experience, such that site works shall not be hampered due to non-availability of these spares. Contractor shall submit a complete list of such spares along with the bid, the cost of which shall be deemed to have been included in the lump sum proposal price of the package. The unused commissioning spares may be left at the site for use by the Owner, if so agreed at a cost to be negotiated.~~	
4.03.02	No mandatory or recommended spares will be used during the commissioning of the equipment/plant before take over by the Employer.	
4.04.00	Mandatory spares	
4.04.01	~~The mandatory spares as listed elsewhere in this chapter are those spares which are considered essential by the Employer. The Employer reserves the right to buy any or all of these mandatory spares. The Bidder shall furnish the itemized and total prices for these spares in the offer.~~	
4.04.02	~~In compliance with the requirements of tender documents, the prices for mandatory spares must be given separately, and shall be used for bid evaluation purposes. All mandatory spares shall be delivered at site.~~	
4.05.00	Recommended spares	
4.05.01	~~In addition to the mandatory spares, the Contractor shall also provide a list of recommended spares giving unit prices and total prices for 3 years of normal operation of equipment in the relevant schedule of the Section-VII. This list shall take into consideration the specified mandatory spares and should be a separate list. The Employer reserves the right to buy any or all the recommended spares. The recommended spares parts shall be delivered at the site. The list of recommended spares to be furnished by the Bidder should also contain the following:~~	
RIHAND STPP-III SWITCHYARD EXTN. PKG.		BID DOC NO. CS-1240-572D-2
TECHNICAL SPECIFICATIONS		PART-I SECTION-VI
Page G-14/48		

Clause No.	TECHNICAL REQUIREMENTS	
	a) Population of each item installed along with reference drawing number. b) Service life expectancy of each item. c) Offer validity period	
4.05.02	Price of recommended spares will not be used for evaluation of bids. The prices of these spares will remain valid for a period of six months after the date of placement of Notification of Award. Whenever recommended spares are the same as mandatory spares, then the prices of the mandatory spares and such common recommended spares shall be the same. Further, the prices of any recommended spares, which are not common with mandatory spares listed in the volume, shall be subject to review by the Employer and shall be finalised after mutual discussions.	
4.06.0	Tools & tackles The Contractor shall also supply at site one set of all special tool & tackles, etc. which are required by the Employer's maintenance staff to maintain the works successfully, cost of the same shall be included in bid price. The list of such tools and tackles shall be enclosed with the offer.	
5.00.00	TYPE, ROUTINE AND ACCEPTANCE TESTS:	
5.01.00	TYPE TEST REQUIREMENTS FOR EQUIPMENTS OTHER THAN 400 kV BUS REACTOR	
5.01.01	All equipments to be supplied shall be of type tested design. During detail engineering, the contractor shall submit for Owner's approval the reports of all the type tests as listed in this specification and carried out within last ten years from the date of techno-commercial bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a Client.	
5.01.02	However if contractor is not able to submit report of the type test(s) conducted within last ten years from the date of techno-commercial bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no additional cost to the owner either at third party lab or in presence of client/ owners representative and submit the reports for approval.	
5.01.03	All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.	
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS
PART-I SECTION-VI	Page G-15/48	

Clause No.	TECHNICAL REQUIREMENTS	
5.01.04	The type test reports once approved for any projects shall be treated as reference. For subsequent projects of NTPC, an endorsement sheet will be furnished by the manufacturer confirming similarity and "No design Change". Minor changes if any shall be highlighted on the endorsement sheet.	
5.02.00	TYPE TEST REQUIREMENTS FOR 400 kV 3 ph. BUS REACTOR	
5.02.01	The contractor shall carry out the type tests as listed in this specification on the equipment to be supplied under this contract. The bidder shall indicate the charges for each of these type tests separately in the relevant schedule of Section – VII (Forms & Procedures) and the same shall be considered for the evaluation of the bids. The type tests charges shall be paid only for the test(s) actually conducted successfully under this contract and upon certification by the employer's engineer.	
5.02.02	The type tests shall be carried out in presence of the employer's representative, for which minimum 15 days notice shall be given by the contractor. The contractor shall obtain the employer's approval for the type test procedure before conducting the type test. The type test procedure shall clearly specify the test set-up, instruments to be used, procedure, acceptance norms, recording of different parameters, interval of recording, precautions to be taken etc. for the type test(s) to be carried out.	
5.02.03	In case the contractor has conducted such specified type test(s) within last ten years as on the date of bid opening, he may submit during detailed engineering the type test reports to the owner for waiver of conductance of such type test(s). These reports should be for the tests conducted on the equipment similar to those proposed to be supplied under this contract and test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. The owner reserves the right to waive conducting of any or all the specified type test(s) under this contract. In case type tests are waived, the type test charges shall not be payable to the contractor.	
5.02.04	Following components to be supplied shall be of tested design. During detailed engineering, the contractor shall submit for employer's approval the reports of all the type tests as listed below in specification and carried out within last ten years from the date of bid opening. The reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witness by a client. However if the contractor is not able to submit report of the type test(s) conducted within last ten years from date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no	
RIHAND STPP-III SWITCHYARD EXTN. PKG.		BID DOC NO. CS-1240-572D-2
TECHNICAL SPECIFICATIONS		PART-I SECTION-VI
		Page G-16/48

Clause No.	TECHNICAL REQUIREMENTS			
	additional cost to the employer either at third party lab or in presence of client/employer's representative and submit the reports for approval. (a.) 132 KV and above Bushings. (b.) Tank Vacuum and Pressure test 5.02.05 All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price. 5.02.06 The type test reports once approved for any project shall be treated as reference. For subsequent projects of NTPC, an endorsement sheet will be furnished by the manufacturer confirming similarity and "No design Change". Minor changes if any shall be highlighted on the endorsement sheet. 6.00.00 REQUIREMENTS IN RESPECT OF SUPPLY ITEMS 6.01.00 All the major equipments to be supplied for the project shall meet the following requirements: (A) 400 kV EQUIPMENTS I. 400 kV CIRCUIT BREAKERS 400kV Circuit Breakers being offered should be from manufacturer who has manufactured and supplied minimum five(5) nos. of three phase circuit breakers suitable for Air Insulated Substation/ Switchyard of 400 kV or above class which must have been in successful operation for a minimum period of two(2) years as on the date of techno-commercial bid opening. II. 400 kV INSTRUMENT TRANSFORMERS 400 kV Instrument Transformers being offered should be from manufacturer who has manufactured and supplied minimum fifteen (15) nos. of single phase Current Transformers and fifteen (15) nos. of single phase Capacitor Voltage Transformers suitable for Air Insulated Substation/ Switchyard of 400 kV or above class which must have been in successful operation for a minimum period of two (2) years as on the date of techno-commercial bid opening.			
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-I SECTION-VI	Page G-17/48

Clause No.	TECHNICAL REQUIREMENTS			
	III. 400 kV DISCONNECTORS 400kV Disconnectors being offered should be from manufacturer(s) who have manufactured and supplied atleast five (5) nos. of three phase Disconnectors suitable for Air Insulated Substation/Switchyard of 400kV or above class which must have been in successful operation for a minimum period of two (2) years as on the date of techno-commercial bid opening. IV. 400 kV SURGE ARRESTORS 400kV Surge Arrestors being offered should be from manufacturer who has manufactured and supplied atleast fifteen (15) nos. of single phase Surge Arrestors suitable for Air Insulated Substation/ Switchyard of 400kV or above class which must have been in successful operation for a minimum period of two (2) years as on the date of techno-commercial bid opening. (B) 132 kV EQUIPMENTS I. 132 kV CIRCUIT BREAKERS 132 kV Circuit Breakers being offered should be from manufacturer who has manufactured and supplied minimum five(5) nos. of three phase circuit breakers suitable for Air Insulated Substation/ Switchyard of 132 kV or above class which must have been in successful operation for a minimum period of two(2) years as on the date of techno-commercial bid opening. II. 132 kV INSTRUMENT TRANSFORMERS 132 kV Instrument Transformers being offered should be from manufacturer who has manufactured and supplied minimum fifteen (15) nos. of single phase Current Transformers and fifteen (15) nos. of single phase Capacitor Voltage Transformers suitable for Air Insulated Substation/ Switchyard of 132 kV or above class which must have been in successful operation for a minimum period of two (2) years as on the date of techno-commercial bid opening.			
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-I SECTION-VI	Page G-18/48

Clause No.	TECHNICAL REQUIREMENTS			
	III. 132 kV DISCONNECTORS 132 kV Disconnectors being offered should be from manufacturer(s) who have manufactured and supplied atleast five (5) nos. of three phase Disconnectors suitable for Air Insulated Substation/Switchyard of 132 kV or above class which must have been in successful operation for a minimum period of two (2) years as on the date of techno-commercial bid opening. IV. 132 kV SURGE ARRESTORS 132 kV Surge Arrestors being offered should be from manufacturer who has manufactured and supplied atleast fifteen (15) nos. of single phase Surge Arrestors suitable for Air Insulated Substation/ Switchyard of 132 kV or above class which must have been in successful operation for a minimum period of two (2) years as on the date of techno-commercial bid opening. (C) 400kV, 80 MVA_r, 3-PHASE BUS REACTOR (I) Bidder/Sub-vendor should have designed, manufactured, 400 KV or above class shunt reactors of atleast 50 MVAR capacity (either three phase as a single unit or bank of three single phase reactors of atleast 16.67 MVAR each) which should have been in successful operation at atleast two (2) different installations for atleast two(2) years as on date of Techno-commercial bid opening. OR (II) Bidder/Sub-vendor who have designed, manufactured, installed/supervised installation and commissioned/supervised commissioning of atleast two(2) nos. 400 KV or above class transformer/ 220 KV or above class reactor which are in successful operation for two (2) years as on date of Techno-commercial bid opening and have established manufacturing facilities for 400 KV class shunt reactors based on technological support of its associate or			
RIHAND STPP-III SWITCHYARD EXTN. PKG.	BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-I SECTION-VI	Page G-19/48

Clause No.	TECHNICAL REQUIREMENTS																							
	ANNEXURE-I																							
	PROJECT SYNOPSIS																							
1.00	PROJECT INFORMATION																							
1.01	BACKGROUND																							
	<table border="1"><tr><td colspan="2">Details of proposed Stage / Units</td></tr><tr><td>Project name :</td><td>Rihand STPP-III</td></tr><tr><td>No. of Units x capacity :</td><td></td></tr><tr><td>Project setting up by :</td><td>NTPC Limited</td></tr></table>				Details of proposed Stage / Units		Project name :	Rihand STPP-III	No. of Units x capacity :		Project setting up by :	NTPC Limited												
Details of proposed Stage / Units																								
Project name :	Rihand STPP-III																							
No. of Units x capacity :																								
Project setting up by :	NTPC Limited																							
1.02	Location and Approach <table><tr><td>Project Location</td><td>(i) Place : Rihandnagar (ii) District : Sonebhadhra (iii) State : U.P.</td></tr><tr><td>Latitude and Longitude of project location</td><td>North : 240 01' 49" and East : 820 47' 25"</td></tr><tr><td>Nearest Railway station</td><td>Renukut</td></tr><tr><td>Distance of project location from the Railway station</td><td>75 Kms (approx.)</td></tr><tr><td>Nearest Major Town</td><td>Varanasi</td></tr><tr><td>Distance of the town from the Project site</td><td>200 kms</td></tr><tr><td>Nearest Commercial Airport</td><td>Varanasi</td></tr><tr><td>Distance of airport from the project site</td><td>200 kms</td></tr><tr><td>Nearest Highway</td><td></td></tr><tr><td>Any other information:</td><td>Further to the information given in this sub-section, Bidders are advised to visit the project site and collect data on local site conditions</td></tr></table>				Project Location	(i) Place : Rihandnagar (ii) District : Sonebhadhra (iii) State : U.P.	Latitude and Longitude of project location	North : 240 01' 49" and East : 820 47' 25"	Nearest Railway station	Renukut	Distance of project location from the Railway station	75 Kms (approx.)	Nearest Major Town	Varanasi	Distance of the town from the Project site	200 kms	Nearest Commercial Airport	Varanasi	Distance of airport from the project site	200 kms	Nearest Highway		Any other information:	Further to the information given in this sub-section, Bidders are advised to visit the project site and collect data on local site conditions
Project Location	(i) Place : Rihandnagar (ii) District : Sonebhadhra (iii) State : U.P.																							
Latitude and Longitude of project location	North : 240 01' 49" and East : 820 47' 25"																							
Nearest Railway station	Renukut																							
Distance of project location from the Railway station	75 Kms (approx.)																							
Nearest Major Town	Varanasi																							
Distance of the town from the Project site	200 kms																							
Nearest Commercial Airport	Varanasi																							
Distance of airport from the project site	200 kms																							
Nearest Highway																								
Any other information:	Further to the information given in this sub-section, Bidders are advised to visit the project site and collect data on local site conditions																							
1.03	~~Criteria for Wind Resistant Design of Structures and Equipment~~ ~~All structures and equipment of the power plant, including plant auxiliary structures and equipment, shall be designed for wind forces as given as given in the Appendix - I of this subsection.~~																							
1.04	~~Meteorological information~~ ~~The Meteorological data are enclosed as Appendix-III of this section.~~																							
RIHAND STPP-III SWITCHYARD EXTN. PKG.		BID DOC NO. CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-I SECTION-VI																				
				Page G-22/48																				

Clause No.	TECHNICAL REQUIREMENTS	
------------	------------------------	---

	Chapter-G2
	ADDITIONAL CONSTRUCTION WORK SPLIT RESPONSIBILITIES
	GENERAL
1.00.00	
1.01.00	The following shall supplement the conditions already contained in the other parts of these specifications and documents and shall govern that portion of the work or this contract to be performed at site.
1.02.00	The Contractor upon signing of the contract shall, in addition to a Project Co-ordinator, nominate another responsible officer as his representative at site suitably designated for the purpose of overall responsibility and co-ordination of the works to be performed at site. Such person shall function from the site office of the Contractor during the pendency of contract.
	REGULATION OF LOCAL AUTHORITIES AND STATUTES
2.00.00	
2.01.00	The Contractor shall comply with all the rules and regulations of local authorities during the performance of his field activities. He shall also comply with the Minimum Wages Act, 1948 and the Payment of Wages Act (both of the Government of India) and the rules made thereunder in respect of any employee or workman employed or engaged by him or his sub-Contractor.
2.02.00	All registration and statutory inspection fees, if any, in respect of his work pursuant to this contract shall be to the account of the Contractor. However, any registration, statutory inspection fees lawfully payable under the provisions of the any statutory laws and its amendments from time to time during erection in respect of the plant equipment ultimately to be owned by the Employer, shall be to the account of the Employer. Should any such inspection or registration need to be re-arranged due to the fault of the Contractor or his Sub-contractor, the additional fees to such inspection and/or registration shall be borne by the Contractor.
	EMPLOYER'S LIEN ON EQUIPMENT
3.00.00	
3.01.00	The Employer shall have lien on all equipment including those of the Contractor brought to the site for the purpose of erection, testing and commissioning of the plant. The Employer shall continue to hold the lien on all such equipment throughout the period of contract. No material brought to the site shall be removed from the site by the Contractor and/or his Sub-contractors without the prior written approval of the Project Manager.
	INSPECTION, TESTING AND INSPECTION CERTIFICATES
4.00.00	
4.01.00	~~The provisions of the clause entitled Inspection, Testing and Inspection Certificates under General Technical Requirements in Chapter-G1 shall also be applicable to the erection portion of the works. The Project Manager shall have the right to re-inspect any equipment though previously inspected and approved by him at the Contractor's works, before and after the same are erected at site. If by the above inspection, the Project Manager rejects any equipment, the Contractor shall make good for such rejections either by~~

RIHAND STPP-III SWITCHYARD EXTN. PKG.	Bid Doc. No.: CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-III SECTION-VI	Page G2- 1 of 15
--	---------------------------------	-----------------------------	------------------------	---------------------

Clause No.	TECHNICAL REQUIREMENTS	
------------	------------------------	---

	~~replacement or modification/ repairs as may be necessary to the satisfaction of the Project Manager. Such replacements will also include the replacements or re-execution of such of those works of other Contractors and/or agencies, which might have got damaged or affected by the replacements or re-work done to the Contractor's work.~~
5.00.00	ACCESS TO SITE AND WORKS ON SITE
5.01.00	Suitable access to and possession of the Site shall be afforded to the Contractor by the Employer in reasonable time.
5.02.00	The works so far as it is carried out on the Employer's premises, shall be carried out at such time as the Employer may approve and the Employer shall give the Contractor reasonable facilities for carrying out the works.
5.03.00	In the execution of the works, no person other than the Contractor or his duly appointed representative, Sub-contractor and workmen, shall be allowed to do work on the site, except by the special permission, in writing of the Project Manager or his representative.
6.00.00	CONTRACTOR'S SITE OFFICE ESTABLISHMENT
6.01.00	The Contractor shall establish a site office at the site and keep posted an authorised representative for the purpose of the Contract. Any written order or instruction of the Project Manager or his duly authorised representative, shall be communicated to the said authorised resident representative of the Contractor and the same shall be deemed to have been communicated to the Contractor at his legal address.
7.00.00	DISCIPLINE OF WORKMEN
7.01.00	The Contractor shall adhere to the disciplinary procedure set by the Project Manager in respect of his employees and workmen at site. The Project Manager shall be at liberty to object to the presence of any representative of employee of the Contractor at the site, if in the opinion of the Project Manager such employee has mis-conducted himself or is incompetent or negligent or otherwise undesirable and then the Contractor shall remove such a person objected to and provide in his place a competent replacement.
8.00.00	CONTRACTOR'S FIELD OPERATION
8.01.00	The Contractor shall keep the Project Manager informed in advance regarding his field activity plans and schedules for carrying out each part of the works. Any review of such plan or schedule or method of work by the Project Manager shall not relieve the Contractor of any of responsibilities towards the field activities. Such reviews shall also not be considered as an assumption of any risk or liability by the Project Manager or the Employer or any of his representatives and no claim of the Contractor will be entertained because of the failure or inefficiency of any such plan or schedule or method of work reviewed. The Contractor shall be solely responsible for the safety, adequacy and efficiency of plant and equipment and his erection methods.
8.02.00	The Contractor shall have the complete responsibility for the conditions of the work-site including the safety of all person employed by him or his Sub-contractor and all the properties under his custody during the performance of the

RIHAND STPP-III SWITCHYARD EXTN. PKG.	Bid Doc. No.: CS-1240-572D-2	TECHNICAL SPECIFICATIONS	PART-III SECTION-VI	Page G2- 2 of 15
--	---------------------------------	-----------------------------	------------------------	---------------------