NEPAL ELECTRICITY AUTHOURITY

(Government of Nepal Undertaking)

Project Management Directorate

Project Management Department

Keraun 132/33kV Substation Project

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Letter Ref No: 077/78, Ch.: 48

Date: October 11, 2020

To

All Prospective Bidders,

Sub: Issuance of Clarification -4

Ref: Design, Supply, Installation and Commissioning of 132/33kV Air Insulated Substation (AIS) at Keraun, Morang District with Associated 33kV Sub Transmission Line (OCB: PMD/EGMP/KRON/077/78-01)

Dear Sirs/Madams,

In reference to the captioned Bid Published on 10th August, 2020, we are hereby attaching the clarification-4 sought by the bidders pursuant to clause 7.1 of the bidding documents.

It is hereby requested to acknowledge the receipt of the same.

With Best Regards,

.....
Darshan Ray Yadav
Project Manager

Enclosed:
1. Clarification 4: 9 page
2. Technical Parameters / Particular of transformers: 3 page
3. Specification for Testing Equipments: 11 page

Invitation for Bids (IFB): PMD/EGMP/KRON/077/78- 01

Design, Supply, Installation and Commissioning of 132/33kV Air Insulated Substation(AIS) at Keraun, Morang District with Associated 33kV Subtransmission Line

Project: Electricity Grid Modernization Project

Clarification-4

S.No	**Volume / Section**	**Clause No.**	**Text as per Bid document**	**Prebid Query**	**Reply from NEA**
1		General	Bid Price Scheduled & Technical Specifications	132/33kV,3Ph,40/51.5/63 MVA & 18/22.5 MVA Power Transformer Losses are not furnished in Tender documents. Kindly furnish.	Shall be provided by the bidder as a functional Gurantee
2	Volume-I	2.5 Subcontractor, PDF Page No. 48 of 219		Type test on 132kV voltage class, three phase 63 MVA & 22.5 MVA transformer and Dyanamic Short Ciruit test on similar type of 132kV Vlotage level Transformer. Please clarify Dyanamic Short Ciruit test on any other rating of same voltage class is accepatble or not.	Dyanamic Short Ciruit test on equal or higher rating of transformer of same voltage level will be accepatble.
3	Volume-I-IIB	OLTC Gear Manufacurer/Type, PDF Page No. 350 of 432		MR, Germany & ABB, Sweden or Equivalent is mentioned is required for OLTC Gear. We request you to accept all reputed OLTC manufacurer across the globe with the required type tests, as required in the tender.	As per Bid documents.
4	Volume-IIA, Volume-IIB & Volumne-III	Volume-III, Sr.No. 2.2.1 Volume-IIB, Pdf Page no-427		As per scope of work we understand that Communication Equipments shall be installed & commissioned in Dhuhabi Substation,Padajgungi Substation & Anarmani SS under 132/33kV Keraun New Substation Project. In BPS, Sr.No. 2.2.1, 4 No.s of Communication Panels are provided but as per Vol IIB, Pdf Page no-427, in given SLD , 6 No.s Communication Panels are required in the susbtations. If Anarmani SS is included in scope then total BOQ quantities will be changed accordingly. Please clarify.	Please refer in previous clarification.
5	Volume-IIA	Pdf Page no-12		As per scope of work we understand that 132kV Dead End Tower (DET) shall be installed between existing Tower no 68 & 69 along same alignment and stringing of conductor from Dead end Tower to Subsation Takeoff Gantry is to be done and also we understand that OPGW Cable is already available from 132kV Duhabi S/s to 132kV Anarmani SS. In Continution to that we understand that OPGW Cable shall be installed from Dead end Tower to 132kV Keraun Subsation Takeoff Gantry only. Kindly clarify	OPGW Cable is already available from 132kV Duhabi S/s to 132kV Anarmani SS. Supply and install OPGW for 132kV Keraun SS through LILO.
6	Volume-IIA	Pdf Page no-12		from the scope of work we understand the stringing between angle tower 55 to angle tower 73 is to be done along with in between towers. Please confirm and also provide the detailed scope & distance of these two towers.	It will be provide during Project design.

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Clarification-4

S.No	**Volume / Section**	**Clause No.**	**Text as per Bid document**	**Prebid Query**	**Reply from NEA**
7		Defect Liability, Clause No. 27.10, PDF Page No. 195 of 219	Volume-I	The critical components covered under the extended defect liability are AIS, Power/Auto Transformers, Substation Automation System (SAS) and the period shall be 3 (three) years. We understand that defect liability period is applicable for only Power transformer and Substation Automation System (SAS) only. Please confirm.	confirm
8		Technical specification - Chapter-1- Project specific requirements - S.no. 3.2-(s)	Scope of work - Land development & Gravel Spreading.	We understand that our scope of work reagrding land development, Gravel spreading is limited to present scope of work, i.e. swithcyard area + Control room building area instead of whole area within plot boundary. Earthmat is also applicable for same area instead of whole area. Please clarify.	Land development will be required within whole area within boundary wall where as Gravel spreads is only for switch yard and control room area.
9	Volume-IIA	Clause No. 1.0, PDF Page No. 219		Auxiliary transformer 300kVA, 33/0.4 kV Technical specification is not given. Only 315kVA 11/0.4kV is given in the TS. Please provide.	As per the BPS.
10	Volume-IIA	Clause No. m, PDF Page No. 26		The Contractor shall provide AC/DC feeders for complete future bays also as per single line diagram in addition to bays under present scope. We understand that spare feeders for both ACDB & DCDB are required to be provided for 2 nos. 33kV future bays only. Please clarify.	AC/DC feeders shall be provide for all bays under present scope including spares.
11	Volume-IIA	Clause No. n, PDF Page No. 26		The reference of IS standard (i.e. Indian Standard) mentioned in the technical specification shall be read as equivalent EC or BS or equivalent International Standard. Please clarify whether IS standard will be considered or not.	As per TS, please refer PSR
12	Volume-IIA	Clause No. n, PDF Page No. 27		Spare Unit Long term storage & switching arrangement: In this section requirement of one unit of spare transformer is mentioned for replacement. But in BPS it is not provided. Please confirm the requirement and provide the same BPS.	Quote as per the BPS
13	Volume-IIA	Clause No. f, PDF Page No. 126		Accuracy for CVT is mentioned in 0.5 in BPS. But in specification it is 0.2. Please clarify	Quote as per the BPS
14		Clause No. 1.10.3, PDF Page No. 35 of 57	BPS	33 kV HT armored Copper Cable (1CX400 Sq.mm) for 5 nos. of 33 kV feeder line along with 6 ladder cable trench and termination equipment's at both end joints, double pole structure and with all accessories complete.what it means 6 ladder cable trench? Please clarify	Cable should be laying on ladder in cable trench in six layers.
15		Clause No. 2.1, PDF Page No. 36 of 57	BPS	In BPS scope SAS has been provided for number of bays for all voltage level. We understand that there is no requiremnt for future bays. Please confirm.	Quote and provides as per the BPS. Provision in the software shall be provided for futur bays.

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Project: Electricity Grid Modernization Project

Clarification-4

S.No	**Volume / Section**	**Clause No.**	**Text as per Bid document**	**Prebid Query**	**Reply from NEA**
16			General	Testing equipments specification is not provided in Tender Documents. Please provide the same.	Please find the attached documents.
17		Clause No. Part B Sr. No. 1, PDF Page No. 22 of 57	BPS	Preformed Binding Wire suitable for ACSR "Wolf", the quantity is provided as LOT 30. LOT is generally provided as 1. Please clarify.	Quote as per the corrected BPS.
18		BPS Clause No. 1.1.1, PDF Page No. 3 of 57	BPS	132/33 kV, Three Phase 40/51.5/63 MVA, ONAN/ONAF Power Transfromer complete with On load Tap Changer (OLTC) and RTCC facility with Tank Mounted LA at LV side and Bushing CT on both sides. Separate surge arrestors line item is provided in the BPS. Please clarify whether tank mounted LA is required.	Confirm
19	Volume-IIA	Clause No. C, PDF Page No. 23		As per the scope SCADA communication for the new substation only is to be integrated with Load dispatch centre (LDC) with necessary gateways. Please clarify our understanding.	Refer in previous clarification.
20			Bid Price Scheduled 33kV Bay Extenion works	Biratchowk Substation:Kindly Provide SLD, Layout Arrangements and Drawing of existing scheme (With number and direction of Incomers and Outgoing feeders duly marked; space available for extension shall be indicated with dimensions.)	Please visit site. It wil be underscope of contractor.
21			Bid Price Scheduled 33kV Bay Extenion works	Biratchowk Substation: Kindly Provide Existing Electrical Clearances maintained	As per TS
22			Bid Price Scheduled 33kV Bay Extenion works	Biratchowk Substation: Tower type, height and girder level, type of cnductor used. (Extension of any girder in existing tower)	Please visit the site and mesure yourself.
23			Bid Price Scheduled 33kV Bay Extenion works	Biratchowk Substation:Kindly Provide Existing Earthmat Details	It will be provide during Project design.
24			Bid Price Scheduled 33kV Bay Extenion works	Biratchowk Substation:Kindly Provide Existing DSLP Details	It will be provide during Project design.
25			Bid Price Scheduled 33kV Bay Extenion works	Biratchowk Substation:Kindly Provide Existing Illumination Details	It will be provide during Project design.
26			Bid Price Scheduled 33kV Bay Extenion works	Biratchowk Substation:Kindly Provide Existing Equipment Ratings Details	It will be provide during Project design.
27			Bid Price Scheduled 33kV Bay Extenion works	Biratchowk Substation:Kindly Provide Make, Model & Rating of Exsting Panels: 1) Control & Relay Panel 2) SCADA Panels 3) Annuciator Panels 4) Communication System	It will be provide during Project design.

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Project: Electricity Grid Modernization Project

Clarification-4

S.No	**Volume / Section**	**Clause No.**	**Text as per Bid document**	**Prebid Query**	**Reply from NEA**
28			Bid Price Scheduled 33kV Bay Extenion works	Biratchowk Substation:Kindly Provide Existing Control Room Equipment Arrangement and Indoor Cable Trench Layout	It will be provide during Project design.
29		Sch-4 a, Sl no.4.2.1-Excavation	Excavation - Soil Strata	Since the excavation in all types of soils are paid under single line item as per referred clause, here by we request to provide the soil strata up to 3m depth of proposed substations.	It will be under scope of contractors.
30		Sch-4 a, Sl no.4.2.1-Excavation	Excavation -Different types of soil	In absence of soil strata, we kindly request to split the excvation in to different line items such as Excvation in normal soil, Excvation in soft rock & Excvation in hard rock.	As per BPS
31		cl 3.1, Chapter-14, Civil Works	Land Acquisition	We understand that land is already acquired by NEA and encumbrance free land will be handed over to the contractor after award of the contract, please confirm.	Confirmed
32		Section - 6, Employer requirements - Drawings - SS layout	Scope of Work -Staff quarters, Guard house	As per refered layout staff quarters and guard house is mentioned in drawing whereas same is not provided in price schedule, please clarify.	Staff Quarter & Guard House is not in scope of this bid
33		Technical specification - Chapter-1- Project specific requirements - S.no. 3.2-(s)	Scope of work - Land development & Gravel Spreading.	We understand that our scope of work reagrding land development, Gravel spreading is limited to present scope of work, i.e. swithcyard area + Control room building area instead of whole area with in plot boundary, please confirm.	Confirm. Gravel spreads is only for switch yard and control room area.
34		Technical specification - Chapter-1- Project specific requirements	Exclusion of works	Since the below mentioned works are not covered under scope & also in bid price schedule, We understand that following works are excluded from our scope of work, please confirm. 1. Boundary wall 2. Staff Quarters 3. Guard room	Confirmed
35		cl.5.2, Chapter-14, Civil Works & Sch-4 a	PCC 1:5:10	As per refered technical specification 75mm thickness of PCC 1:5:10 is required to provide below metal spreading, where there is no separate line item is provided in the price shedule, Please clarify & include the same.	If required, the Contractor has to supply the same as specified in the specification without any additional cost to NEA. Bidder has to consider the price of the same in the respective item of equipments or works.
36		Sch-4 a , 4.11.8 & Drawings	Approach road	The description for approach road shown in the drawing (100mm base course, 170mm subbase course , 300mm subgrade) & price schedule (150mm subbase, 125mm base course) is not matching, please clarify.	For approach road, please quote as per TS & dwg.
37		General	Retaining wall	We understand that in case of retaining wall is required during execution same will be paid under unit rates, please confirm.	Retaining wall is not envisaged

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Project: Electricity Grid Modernization Project

Clarification-4

S.No	**Volume / Section**	**Clause No.**	**Text as per Bid document**	**Prebid Query**	**Reply from NEA**
38		Technical specification - Chapter-1- Project specific requirements - S.no. 3.2-(n)	Local consultant for architechtural & structural design for control room building.	Since we are having vast experience in the field of architechtural and structural design of substation control room building, we propose to do the design by our in-house team, trust it is inorder.	As per TS
39		Technical specification - Chapter-1- Project specific requirements - S.no. 3.2-(p) & (q)	SF6 duct supporting structures & foundations.	Asper refered clause it is mentioned that we need to provide foundation & support structural works for SF6 duct, whereas we don't envisage any such scope for the proposed 132/33kV AIS SS, kindly clarify the same.	Confirmed
40		General	Indian Standards	We understand the all the civil, structural design works can be perform as per relavent Indian standards. In case of non - avialability of Indian standards, we need to refer British Standard or Other relavent standards, please confirm.	As per TS, please refer PSR
41		1.3.2 Time Schedule pdf page 39	Time to complete the plant and services from the effective date specified in Article 3 of the Contract Agreement for determining the time for completion of pre-commissioning activities is: 810 Days. No credit will be given for earlier completion. Bids offering a completion date beyond the 810 days shall be rejected.	We understand that project completion period is 810 days from effective date. Please confirm.	Confirmed
42		Pdf Page No.48-Vol-1-Section 3 - Evaluation and Qualification Criteria-2.5 Subcontarctor-Item No. Power Transformer	Type test on 132 kV voltage class, three phase 63 MVA transformer and Dynamic Short Circuit test on similar type of 132 kV Vlotage level Transformer.	As mentioned there that similar type 132 kv Voltage level transformer Dynamic Short Circuit type test will be acceptable. For Example, we will give 132 kV and 40 MVA transformer DSC test report. Is it acceptable or not ?	Please refer in above.
43		Pdf Page No.48-Vol-1-Section 3 - Evaluation and Qualification Criteria-2.5 Subcontarctor-Item No. Power Transformer	General	As per the referred clause,bidder needs to enclose type test reports for all the items. we shall submit type test reports on awrad of contract.Kndly accept and confirm	As per Bid documents.

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Clarification-4

S.No	**Volume / Section**	**Clause No.**	**Text as per Bid document**	**Prebid Query**	**Reply from NEA**
44		Pdf Page No.191-Volume-I,Section-8, Special Conditions of contract-Duties on Equipment, Plant, Materials and Supplies:	Equipment, plant, materials and supplies, imported by the Contractor for execution of the Works, shall be subject to payment of customs duty at a special rate of one percent (1%) of CIP or Customs entry point value. This customs duty shall be paid by the Contractor at the time of import and will be reimbursed by the Employer .	As per the referred clause we understand that for the imported items customs duty shall be reimbursable at a special rate of 1% of CIP or customs entry point value.And VAT for the imported materials shall be exempted and for the materials supplied directly from manufacturing plant in the employers country shall be reimbursed. We understand that the taxes and duties will not be taken for evaluation.Please confirm	Exemption for custom @1% and VAT @13% will be applicable for imported item only. For local supply item VAT will be reimburse by employer. Tax and duties will not be consider during evaluation.
45		General	Operational Acceptance certificate	We understand that Taking over of individual substation are acceptable to NEA. Reconciliation, closure of payment and warranty shall be considered for individual substation wise from the date of Taking over certificate by NEA	confirm
46		Forest / Environment Clearance	General	We presume that Forest/Environment clearance & permission for the clearance from the statutory bodies shall be the responsibility of NEA and we shall be handed over clear land free from any encumbrances at the time of contract award. Please confirm	Confirm.
47	Volume-I	Quantity Variation Cl. No. 39.2.5,GCC, Section-7		As per the referred clause, we understand that quantity of individual item can vary up to any extent subject to maximum of 15% of the contract price. Please Confirm.	As per Bid documents.
48	Volume-I	Appendix-1 Terms and Procedures of Payment		Please clarify whether 10% advance payment is interest free or interest bearing.	Advance Payment is Interest free

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Clarification-4

S.No	**Volume / Section**	**Clause No.**	**Text as per Bid document**	**Prebid Query**	**Reply from NEA**
49		Page No. 190-Volume-I Section 8 - Special condition of contract	14-Taxes and Duties	(i)We understand that custom duties, Value added Tax, Withhodling Tax and all other taxes in employer country is exempted. Please confirm our understanding is correct. (II)We request you that kindly brief us what kind of other taxes will be applicable on this tender in Nepal. (III)Requesting you, please provide us custom duties value on each item wise for subject tender (For Price Schedule-1 & 2 Items). (IV) We kindly request you to please confirm us the applicable rate of income tax in Nepal.	(I) Custom tax@1% and Vat@13% is exempted on imported goods. (II) For other tax, it shall be as per rule of government of nepal.
50		Page No.208, Section 9 – Contract Forms	Insurance	Is there any client preferred insurance firm or bidder can choose any reputable insurance firm ?	Bidders can choose.
51		Page No.33 -clause No.15. SERVICE LEVEL AGREEMENT (SLA)-Vol-II	After the successful commissioning of the entire project, the contractor shall provide the support services which shall include maintenance of the system installed under the project for a period of 3 (three) years from the date of issuance of operational acceptance of the project.	Please confirm that whether we have to add cost of 3 years for operation & maintenance in our bid price under Service Level Agreement or not.	support services is required for extended defect and laibility peroid of equipments and service.
		Page No.39,1.3.3 Operating and Maintenance (O&M) Costs Not Applicable	Operating and Maintenance (O&M) Costs: **Not Applicable**		Applicable for communication.
52			General	We understand that operation and maintenance of the substation & Line is not in the Contractor scope after issuing operational acceptance certificate. Please confirm.	Confirmed

Invitation for Bids (IFB): PMD/EGMP/KRON/077/78- 01

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Clarification-4

S.No	**Volume / Section**	**Clause No.**	**Text as per Bid document**	**Prebid Query**	**Reply from NEA**
53		Section 8 - Special Conditions of Contract-Page No.195	27. Defect Liability-The critical components covered under the extended defect liability are AIS, Power/Auto Transformers, Substation Automation System (SAS) and the period shall be 3 (three) years.	We understand that extended defect liability are only for Transformers, Substation Automation System (SAS). AIS word is mentioned by error, if not then please confirm us meaning of AIS.	Refer amendment 1
54		ITB 19.1-Section 2 Bid Data sheet-page No.34	(a) The prices shall be quoted either in the currency/(ies) of the Bidder's home country. (b) A Bidder expecting to incur a portion of its expenditures in the performance of the Contract in more than one currency, and wishing to be paid accordingly, shall so indicate in the Schedule of Prices and the Letter of Price Bid.	(a)We interpret meaning of point (a) that we can quote in Indian rupees since we are Indian company. Please confirm. (b) Suppose if we want to quote in USD all schedule 1 items. Is it acceptable or not?	As per Bid documents.
55		Section 8 - Special Conditions of Contract-Page No.189	7. Scope of Facilities 7.3 The Contractor agrees to supply spare parts for a period of years: 5 Years	We understand that don’t need to add 5 year spares cost in our bid price, for now we have to give acceptance for supplying spare parts for 5 year, whenever employer will place separate order, contractor should arrange material in 6 months from opening of LC.	As per Bid documents.

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S.No	**Volume / Section**	**Clause No.**	**Text as per Bid document**	**Prebid Query**	**Reply from NEA**
56		Page No.27,Vol-II-Technical Specification-Chapter 1: Project Specific requirement	For supply of SF6 Gas, the contractor shall obtain necessary license from the concerned statuary authorities in Nepal. The contractor shall comply with all the legal & statuary requirements as per the local laws for importing, handling & storage of SF6 gas in Nepal. For this purpose NEA shall extend necessary assistance (documentation etc.) for obtaining such clearance & licenses, however the complete responsibility for submitting the application and co-ordination with authorities shall be in the scope of contractor.	We request you please provide more details like what kind of permission will be required and there is any cost for getting this permission. Please confirm.	As per rule and regulation of Nepal Government.
57		General	Due to Covid -19	We request you please allow for electronically bid submission in place of hard copy.	As per Bid documents.
58				As per Technical Specification, Cooling base is Two ONAN/ONAF (51.5MVA/63MVA) , however as per Technical Data Sheet (TDS) Cooling base is three ONAN/ONAF1/ONAF2 (40/51.5/63MVA). Please clarify.	Please quote as per BPS and provide the cooling base and rating as per TDS.
Additional Clrification					
58			Clarification 3, Pont No 57	NEA reply "As per TS"	NEA reply "As per TS" is corrected as "Please quote as per BPS". Corrected Technical Particulars for power trnsformer is attached.

6.1 Technical Particulars / Parameters of Transformers (132/33 kV and 132/11, 3-Phase Power Transformer)

Cl. No.	Description	Unit	TECHNICAL PARAMETERS	
1.1	Rated Capacity	MVA	40/51.5/63	18/22.5
1.2	Voltage ratio (HV/LV) Line to line	kV	132/33	132/11
1.3	Single / Three Phase Design		3 (THREE)	
1.4	Applicable Standard		IEC 60076	
1.5	Frequency	Hz	50	
1.6	Cooling		ONAN/ONAF 1/ONAF2	
1.7	Type of Transformer		Constant Ohmic impedance type (Refer note 1)	
1.8	HV-LV Impedance at 75 Deg C			
i)	Principal tap	%	>11	>11
ii)	Tolerance on Impedance	%	As per IEC	
1.9	Service		**Outdoor**	
1.10	Duty		CONTINUOUS	
1.11	Overload Capacity		IEC 60076-7	
1.12	Temperature rise over 50deg C Ambient Temp			
i)	Top oil measured by thermometer	^{o}C	50	
ii)	Average winding measured by resistance method	^{o}C	55	
1.13	Windings			
i)	System Fault level			
	HV	kA	31.5	31.5
	LV	kA	25	
	Neutral	kA	-	
ii)	Lightning Impulse withstand Voltage			
	HV	kV_p	650	650
	LV		170	75
	Neutral	kV_p	95	42
iii)	Switching Impulse withstand Voltage			
	HV	kV_p	650	650
iv)	One Minute Power Frequency withstand Voltage			
	HV	kV_{rms}	275	275
	LV	kV_{rms}	75	28
v)	Neutral Grounding		Solidly grounded	
vi)	Insulation			

	HV		GRADED	
	LV		UNIFORM	
vii)	Tan delta of winding	%	<0.5%	
1.14	Vector Group (3 –ph) (unless specified differently elsewhere)		YNynO	YNyn0
1.15	Vector group, if tertiary is provided		YNyn0D11	YNynD11
1.16	Tap Changer		OLTC Vacuum type	
i)	Tap Range & No. of steps		–10% to +10% of HV variation in the step of 1.25%, 17 steps	
ii)	Location of Tap changer		On Neutral side of 132 kV/HV winding	
iii)	Design		Constant flux voltage variation type as per cl. 6.2 of IEC 60076 part-I	
iv)	Tap control		Full capacity on load tap changer suitable for group/independent, remote /local electrical and local manual operation and bi-directional power flow.	
1.17	Bushings			
i)	Rated voltage			
	HV	kV	145	145
	LV	kV	36	12
	Neutral	kV		
ii)	Rated current (Min.)			
	HV	A	400	400
	LV	A	1200	1200
iii)	Lightning Impulse withstand Voltage			
	HV	kVp	650	650
	LV	kVp	170	75
iv)	One Minute Power Frequency withstand Voltage			
	HV	kVrms	275	275
	LV	kVrms	75	28
	Neutral	kVrms	55/32	
v)	Minimum total creepage distances			
	HV	mm	3625	3625
	LV	mm	900	300
	Neutral	mm	300	
vi)	Tan delta of bushing			
	HV	%	<0.4	
vii)	Max Partial discharge level at U_m			
	HV	pC	10	
1.18	Max Partial discharge level at	pC	100	

	1.5Um/√3		
1.19	Max Noise level at rated voltage and at principal tap on full load and all cooling active	dB	75

Notes:

1. For parallel operation of transformers, the impedance, OLTC connection & range and the winding configuration (if necessary) is to be matched.

2. No external or internal Transformers / Reactors are to be used to achieve the specified HV/IV, HV/LV and IV/LV impedances.

3. Tan delta of Winding & Bushing shall be measured at ambient temperature. No temperature correction factor shall be applied.

4. The criteria for Transformer losses shall be "**Copper Loss (Load Loss) > Iron Loss (No Load Loss) > Cooler Loss (Auxiliary Loss)".**

Specification for Testing Equipments

A. Digital Multimeter:

Overview:

- 2000 count digital display
- 1000 V DC / 750 V AC ranges
- 10 A AC / DC ranges
- Resistance, frequency and capacitance ranges
- Non-contact voltage detector
- CAT III 600 V

Specification: Digital multi meter	
Display	2000 counts
Polarity	Automatic positive implied, negative indicated
Over-range indication	"OL" or "-OL"
Battery indicator	"<" is displayed when the batteries voltage drops below operating voltage
Auto power down	Approx. 10 minutes
Operating ambient	Non-condensing ≤10 °C, 11 °C ~ 30 °C (≤80% R.H) 31°C ~ 40 °C (≤75% R.H), 41 °C ~ 50 °C (≤45% R.H)
Storage temperature	-20 °C to 60 °C, 0 to 80% R.H. when
range and humidity	battery removed from meter
Temperature co-efficient	0.15 x (Spec. Accy.) / °C, < 18 °C or > 28 °C
Sample rate	Samples 2 times per second nominal
2Power supply	1.5 V x 2 LR03 or AAA size
Battery life	Alkaline 250 hours
ELECTRICAL	Accuracy is ± (% reading + number of digits) at 23°C ± 5°C < 80%RH.
AC/DC volts	Range200.0 mV2.000 V *20.00 V ~ 200.0 V *750 V AC / 1000 V DC
AC Accuracy	Unspecified±(1.5%+5 dgts) 50 Hz ~ 300 Hz±(1.5%+5 dgts) 50 Hz ~ 500 Hz *±(1.5%+5 dgts) 50 Hz ~ 500 Hz *
DC Accuracy	±(0.5% + 2 dgts)
DC/AC current	Range 2.000 A 10.00 A **
DC Accuracy	±(1.0% + 3 dgts) ±(1.0% + 3 dgts)
AC Accuracy	±(1.5% + 5 dgts) 50 Hz ~ 500 Hz*
Voltage Burden	2 V max2 V max

B. Tong /Clamp Tester

- Option of current only ,
- Measures up to 400 A a.c. with low current ranges for improved resolution
- 600 V a.c./d.c.
- 20 MΩ Resistance
- Data Hold
- Max Hold
- Small pocket-size design
- Exceptional battery lifetime
- Supplied with carry case
- IEC61010 CAT III 600 V

Specification

AC current 50 Hz	Range	Accuracy
	0-40A	±1.9% ±10 digits
	40-200A	A±1.9% ±5 digits
	201-400A	A±1.9% ±5 digits
DC and AC volts	Ranges 0 - 200.0 V	200.0 - 600.0 V
Accuracy	DC±1.0% ±2 dgts	AC±1.5% ±5 dgts(50-500 Hz)
Resistance	Range 200.0 Ω 2.000 KΩ 20.00 KΩ 200.0 KΩ 2.000 MΩ 20.00 MΩ	Accuracy ±1% ±5% digits ±0.7% ±2 digits ±0.7% ±2 digits ±0.7% ±2 digits ±1.0% ±2 digits ±1.9% ±5 digits
Power	requirements1 x PP3 9 V alkaline battery	2 x AAA 1.5 A alkaline battery
Maximum conductor size	27 mm diameter	
LCD:	2000 digit large scale readout	

C. 5kV Insulation Tester

The tester's accuracy is specified for one year after calibration at operating temperatures of 0 °C to 35 °C. For operating temperatures outside the range (-20 °C to 0 °C and 35 °C to 50 °C), add ± .25 % per °C, except on the 20 % bands add ± 1 % per °C.

Insulation resistance measurement

Test voltage (dc)	Range	Accuracy (± reading)
1000 V	< 200 kΩ	unspecified
	200 kΩ to 20 GΩ	5%
	20 GΩ to 200 GΩ	20%
	> 200 GΩ	unspecified
5000 V	< 200 kΩ	unspecified
	200 kΩ to 100 GΩ	5%
	100 GΩ to 1 TΩ	20%
	> 1 TΩ	unspecified
Bar graph range	0 to 1 TΩ (1550C) - 0 to 2 TΩ (1555)	
Insulation test voltage accuracy	0% , +10 % at 1 m	
Display	75mm x 105mm	
Power	12v Lead acid rechargeable battery	
Charger input	(AC) 85V to 250V ac 50/50hz 20VA	

D. Electronic Total Station

S.NO.	TECHNICAL DESCRIPTION	:	SPECIFICATION REQUIRED
1	Magnification	:	30X.
2	Effective diameter of objective	:	45mm.
3	Shortest focusing distance	:	1.5m.
4	Laser pointer	:	Should be available.
5	Operating Temperature	:	-20^0C to $+50^0$C.
6	Angular accuracy	:	2" Accuracy.
7	Distance measurement accuracy	:	2mm + 2ppm (With Prism).
8	Clamps (Horizontal & Vertical)	:	Endless with clamping.
9	Plummet	:	Built in Laser plummet
10	Compensator	:	Dual Axis.
11	Compensator range	:	Dual axis with $\pm$ 3'
12	Distance measurement with Single Prism	:	4500m or more .
13	Distance measurement without Prism	:	280 m or more.
14	Point Memory	:	50,000 points.
15	Batteries	:	2x Rechargeable Lithium ion Batteries with at least 10 hours of operation.
16	Communication (Data transfer)	:	USB port, Integrated Bluetooth, and support for pen drive
17	Display	:	LCD Display
18	Water & Dust protection	:	IP 66 or better
19	Angle Measurement	:	Absolute Encoding System.

Original (Original Equipment Manufacturer) OEM List of Items to be supplied along with the main equipment for Each Unit.

i) Heavy duty wooden Tripod – 1 no each,

ii) Single circular Prism with Target plate holder – 1 no each,

iii) Telescopic Prism pole (2.6m) – 1 no each,

iv) Internal Batteries: Rechargeable Lithium ion type – 2 no each,

v) Charging kit : 1 no each with facility for charging 1 or more batteries at a time.

vi) Good Quality Box for Instrument and accessories.

E. HIGH VOLTAGE TEST KIT 80 KV

1.0 INTRODUCTION:

The utility of this will be for the testing of applied voltage test on CT, PT, Transformers, switchgears, cables, Insulators etc.at various stages of manufacturing and/or erection at different applied voltages.

2.0 TECHNICAL DATA

2.1 Input supply : 0-230 V± 10% volts, 1 Phase, 50 ± 5% Hz, AC supply.

2.2 Output voltage : Continuously variable 0 to 80 KV AC.

2.3 Capacity : 100mAin 0-80 KV range

2.4 Duty Cycle : 5 min On, 10 min Off.

2.5 Accuracy of TR. : ±3 % or better

2.6 Accuracy of Ammeter, Voltmeter : ±1 % or better

2.7 Percentage Impedance : not more than 8% in any case.

2.8 Output voltage variation : By means of motor driven arrangement.
Over load Tripping adjustment through site selection: At 10mA, 20mA, 50mA and 100mA AC.
Over Voltage Indication & Interlock Protection provided.
Normal over Load Tripping set at 50 mA

3.0 FEATURES OF 0-80 KV, AC HV TEST KIT

The equipment must be in two main units to be provided with wheels for easy movement as described below :

3.1 Control and Metering unit:

It should consists of main input fuses, MCB, contactor fuses, supply indication lamps, push buttons, timers, automatic overload tripping circuits 'EMERGENCY OFF' pushbutton., meters etc. housed in a robust cabinet with adequate ventilation and should have good aesthetic appearance. Digital meters of reputed make for indication as well as for measurement are preferred over analog. The cables/ wiring to be terminated on suitable terminal blocks with crimped lugs and ferrule nos. Gland plate should be provided at the bottom or rear side for cable entry. The whole control circuitry will be housed within a sheet metal cabinet treated properly and powder coated. Continuously variable autotransformer (Rated to operate on 0-230 V, 50 Hz)of suitable capacity(Current capacity shall not be less than 40Amp.) to increase/decrease the output test voltage up to the required voltage level. INCREASE/DECREASE circuit to control motor operated Voltage Regulator. The continuously variable Auto Transformer shall be natural air coled. When high voltage circuit is switched ON the regulator will rotate to increase the output voltage when INCREASE / DECREASE switch is kept in 'INCREASE' position and 'INCREASE' push is pressed ON or decrease the output voltage when the 'INCREASE/ DECREASE' switch is kept in 'DECREASE' position.

3.1.1 Protection & Interlock:

Enclosure interlocking will be provided i.e. high voltage circuit cannot be energised unless the door of the enclosure is closed. However, this interlock can be by-passed by shorting corresponding terminals. Zero start interlocking will be provided to ensure that the HV circuit cannot be energized unless the regulator is initially kept or brought back to zero position. Automatic tripping mechanism for protecting the HV transformer against over loading, the tripping mechanism can be adjusted at values as mentioned above. After tripping, High Voltage will be switched OFF. In case the output voltage crosses the maximum rated value a lamp & a buzzer will indicate overvoltage and the increase mode circuit will not function further, even if 'PRESS TO INCREASE' push is pressed.

The instruments for indications and measurements include following:

Voltmeter	:	Digital Voltmeter generally connected to the tertiary winding of HV Transformer for measurement and scaled in KV. Resolution: 0.1KV.
Ammeter	:	Digital milli ammeter along with 'PRESS TO READ mA' push to read the leakage current at HT side. Resolution: 0.1mA.
KV meter	:	For output voltage measurement
Timer	:	A 'TIMER' (0-999secs.) with start switch will be provided to count down the duration of applied HV. After completion of the test time the regulator will automatically decrease to zero position. 'RESET' feature of the 'TIMER' will be provided.

3.2 High voltage transformer:

Oil cooled step up transformer specially designed to cater HV breakdown applications.

The HV winding of the Transformer is of graded insulation; one end being connected to the earth potential through a CT operated Ammeter & tripping device, while the other end remains in floating condition as HT Terminal. The details of tripping arrangement is also to be clearly defined.

The transformer will be designed to withstand frequent intermittent spark over or short circuit conditions under which such testing transformers are designed to operate.

HT terminal will be provided with anti-corona metallic ring of adequate diameter to facilitate uniform charge distribution.

3.2.1 **Core:** The core of the transformer will be of high grade CRGO steel of M4, M3 or M2 H grade material only.

3.2.2 **Coils:** The coils will be made of 99.99 % pure electrolytic copper conductor with suitable insulation between turns and layers. The primary and secondary coils will be of round shapes so as to withstand mechanical stress during short circuit and during normal operation.

3.2.3 **Wiring:** The wiring will be carried out with suitable cross section multi strand copper conductor. The cable should be terminated with ferrule and crimped lugs on both the ends. The bunch of wire be neatly laid out and secured to the body cabinet with button tape.

3.2.4 HV point to be brought out with suitable porcelain insulator and should have isolated LV point brought out on the top of body to assist tan delta measurement with existing equipment.

3.2.5 The HV and LV Bushing shall be of porcelain and of reputed make and the HV Bushing shall be of adequate voltage rating to withstand 80 KV. The LV side bushing shall be of 1.1 KV class.

4.0 Degree of Protection: IP 53

5.0 CABLES

5.1 Primary cable:

Primary cables should be 3 core and Minimum 20 Meters long suitable for connection to230 ± 10% volts, 50 ± 5% Hz AC supply. 1100 V grade cable to be used.

6.0 PAINTING:

HV test equipment shall be powder coated outside with epoxy paint light gray RAL-7035 and inside with white epoxy paint and all bright steel components shall be coated with rust preventive paint before dispatch.

7.0 TEST AND INSPECTION

Testing shall be done as per relevant standards. Inspection will be done at supplier's works by NEA representative. Internal testing and QC reports along with one copy instruction manual shall be furnished for NEA's approval before giving call for inspection.

Supplier should have all the facility to conduct the following basic tests:-

1. No Load Current of the Auto Transformer.
2. Insulation test of H.V. Transformer.
3. No Load and Load Test on Continuously Variable Auto Transformer.
4. Turns ratio (%Error) measurement of the P.T.

The supplier should submit with offer, the testing scheme together with Line Diagram for all the test required on the above H.V. Tester.

8.0 INSTRUCTION MANUAL:

The instructional manual shall consist of following sections. The instruction manual shall be made on good quality paper (at least 90 gsm) and shall be made in bound volumes (6 copies) suitable for long term usage in shop/site.

- Introduction.
- Photograph of all items of equipment
- Description of equipment, GA drawings, Schematic diagram/ Circuit diagrams.

- Test certificate.
- Detailed procedure to operate the equipment (written in easy language for understanding ofoperators)
- Dos and Donts, FAQ (Frequently asked Questions) and answers
- Trouble shooting flow chart.
- Service centre contact details like address, email address, phone nos, cell nos. etc.

9.0 DOCUMENTATION:

- 1 set complete with drawings/leaflets/catalogue and technical information giving full description, operation, dimensions, weight etc.

Guaranteed Technical particulars

Sl. No.	Item to be replied	To be filled up by the Bidder
1	Name of the Manufacturer	
2.	Model Names of the High voltage P.T. offered by them(Mentioning Item wise Model No., if any)	
3.	What is the voltage ratio of High Voltage P.T.	
4.	Whether the P.T. has the tripping arrangement at selectable leakage current values 10mA, 20 mA, 50 mA, & 100 mA.	
5.	What is the Accuracy Class of the P.T.	
6.	What is the make , resolution & Accuracy class of the KV meter?	
7.	What is the make resolution & Accuracy Class of the milli Amp meter	
8.	What is the make resolution & Accuracy Class of the Timer	
9.	What is the make of Bushing and it's voltage class	
10.	What are the Type tests conducted on H.V. P.T.	
11.	What is the make of C.T. and it's type & Accuracy class	
12	Whether the tripping arrangement of the P.T. has clearly been defined.	
13	No. of Terminals on LV side	
14	Weight and overall dimension of the H.V P.T.	
15	Whether the P.T is oil cooled	
16	Whether the continuously variable Auto Transformer is natural Air cooled?	

F. Transformer Oil Testing Kit

1.0 TECHNICAL SPECIFICATIONS/ REQUIREMENTS OF INSULATING OIL TESTING SET

1.1 GENERAL

This section of the document includes the design, manufacture, testing & inspection of Insulating Oil Testing set as specified.

1.2 SPECIFICATIONS

GENERAL:

Portable fully automatic oil test set kit is intended to be used for testing of Dielectric strength of insulating oils used in transformers and circuit breakers. The test voltage should be electronically controlled up to 80 KV. Oil testing cell has Spherical and mushroom cell, dimensions and gap in accordance with is specifications with a gauge to calibrate the gap and faster switch-off time on flashover or fast tripping at dielectric breakdown (<5µS). The test set shall have the feature of fully automatic operation plus a built in printer to produce a hard copy of the test results.

The unit shall be suitable for laboratory use and it shall be assembled in a closed transparent hard and non-breakable container which shall be either rectangular cubicle shape and it shall be protected from outside sand, moisture etc.

MAIN TECHNICAL PARAMETER:

1.	Measurement Items	Measurement dielectric strength of insulating oil
2.	Power Supply	90 V to 240 V ±10% AC Single Phase at 50 Hz & Minimum 1 hour (7.2Ah) backup with internal rechargeable batteries & Charger unit.
3.	Test Cells	Glass, volume 300 to 500 ml. with protective cover and stirrer.
4.	Electrodes	As mentioned below
5.	Test Voltage	0-80 kV
6.	Rate of Voltage Rise	2 KV/ second
7.	Voltage Measurement Accuracy	± 1KV
8.	Resolution	0.1KV +/- 1%,+/- 2 digits
9.	Display	LCD/ QVGA Colour display with backlight/TFT
10.	Reference Standard	BS EN 60156-96,BS148/EN60156, IEC-60156-95 ,ASTM D-1816-04,ASTM D-877A-02,ASTMD-877B-24, AS1767.2.1
11.	Interface	USB and Bluetooth, internal printer

1.3 FEATURES & ACCESSORIES

- The set shall provide with automatic voltage rise of 2 KV/second, 3 KV/second depending on the test standard selected, Automatic breaking at breakdown of oil and indication of break down voltage.
- The set shall be provided with smooth and continuous control of output voltage between zero and maximum having no distortion of waveform.
- The unit shall be fitted with preferable LCD/TFT/VGA display volt-meter and the volt meter should continue to indicate break-down voltage after circuit breaker trip till reset.
- Audio sound and visual signal should indicate at the instant of sample failure.
- Indication for both supply "ON" and high voltage "ON" shall be available.
- The preferable special features i.e. the unit will be able to perform test on automatically performed in the correct sequence, no risk of contamination during string mode, No

supervision required i.e. operator free to do other work, test voltage continuously monitored oil sample break down voltage recorded, circuit breaker trips upon oil sample break down to de-energise high voltage transformer, safe features including an electro mechanical inter lock system on the solid test vessel chamber, Microprocessor control circuit incorporating fully automatic instrument checking before and during use, indication of a fault condition to be given on the digital displays, to aid servicing, user selectable inter active tests, consistently measurement of water vapour pressure, dew point and relative humidity of a sample of oil.

Accessories

- Vessel 400 ml assembly-1 N0,

  Magnetic bead stirrers -2 Nos,

  Magnetic bead retriever-1 No,

  Electrode spacing /Feeler gauge set 1, 2, 2.5, 2.54 mm,

  IEC60156 electrode Set includes: - 12.7 mm spherical- 2 nos ,36 mm mushroom -2 nos with electrode Set for testing as per IEC Standard, ASTM D877/1816 electrode set - 25.4 mm cylindrical (2 standard, and 2 none standard), 36 mm mushroom 2Nos with electrode Set for testing as per ASTM Standard,

  Printer paper, Power supply lead & Carry Bag
- Constructional and Outline Dimensional drawings data to be supplied along with each unit.
- Original manufacturer's printed catalogue, drawings and operation and maintenance manual to be supplied along with each unit.

2.0 GUARANTEED TECHNICAL PARTICULARS (GTP) FOR

INSULATING OIL TESTING SET

Sl No.	Description	Unit	BPDB's Requirements	Manufacturer's Guaranteed Data
01	Manufacturer's name and address		Shall be mentioned	
02	Manufacturer's Type/model		Shall be mentioned	
03	Country of origin		USA/UK/EU//Japan/Austalia	
04	Reference standards		BS EN 60156-96,BS148/EN60156, IEC-95,ASTM D-1816-04,ASTM D-877A-877B-24, AS1767.2.1.	
05	Construction		Portable fully automatic and the test voltage should be electronically controlled to upto 80 KV. The unit shall be suitable for laboratory use breakable container which shall be rectangular cubicle shape and it shall be protected	
06	Power Supply	V/Hz	90 V to 240 V ±10% AC Single Phase at 50 Hz & Minimum 1 hour (7.2Ah) backup with internal	
07	Test Voltage	KV	0 to 80 KV.	
08	Voltage Measurement Accuracy		± 1KV	
09	Resolution		0.1KV +/- 1%,+/- 2 digits	
10	Voltage of Rise	KV	2 KV/ Sec	
11	Switch-off time at dielectric breakdown	µS	<5µS	
12	External Printer		Built in printer offered and having facility to connect	

13	Internal Printer		Matrix Impact printer	
14	Display		LCD/QVGA Colour display with backlight/TFT	
15	Temperature range	°C	Operation: -10 to + 50°C Storage: -20 to +60°C	
16	Humidity range	RH	Operating: 80% RH at 40°C Storage: 95% RH at 40°C	
17	Electrodes		As per IEC & ASTM standard	
18	Dimension	mm	To be mentioned.	
19	Weight	Kg	To be mentioned	
20	Safety		IEC61010	
21	Accessories to be supplied		As per Features & Accessories (7.5)	
22	The functional diagram along with components lists, operating instructions, maintenance manuals, manufacturer's catalogue, recommended list of spares for 5 (five) years of operation for the		To be submitted	