TAC 2

Our Ref: KETRACO/PT/045/2023 **27th March 2024**

Notice to all Bidders.

TENDER ADDENDUM AND CLARIFICATION No. 2 (TAC 2)

RE: Procurement of Plant, Design, Supply and Installation of the 220kV Mariakani - Dongo Kundu Transmission Line and Associated Substations (KETRACO/PT/045/2023)

The following amendments are made to the specified provisions for the bidding documents for procurement of plant, design, supply and installation of the 220kV Mariakani - Dongo Kundu Transmission Line and Associated Substations (KETRACO/PT/045/2023).

Save where expressly amended by the terms of this clarification, the Principal Tender Document shall continue to be in full force and effect.

Find herein the ADDENDUM and CLARIFICATION No. 2, consisting of forty-two (42) pages into the Principal Tender Documents as attached. This document should be returned along with dully filled Form of Tender.

All other terms and conditions of the Request for Proposal document remains the same.

PETER NJEHIA
SENIOR MANAGER, SUPPLY CHAIN

Tender Addendum and Clarification No. 2 of Tender No. KETRACO/PT/045/2023 has been received and incorporated in the Tender Documents.

Name of Tenderer *(in block letters)*: _____

_____

Signature: _____

Date: _____

Signed for the Tenderer by *(Name in block letters)*: _____

In the office bearer capacity of: _____

18

A. Addendum No. 2

The following amendments have been made to the bid documents.

I. Technical Data Sheets

Specific parts of Section IV Technical Data Sheets shall be modified as indicated hereafter:

3. Technical Datasheet for 33 kV Insulators

	Post-Type Insulators	Minimum Requirements		Data offered by Bidder
		Unit	Data	
1.1	Manufacturer's name			
1.2	Material		Porcelain /Composite	
1.3	Installation		outdoor	
1.4	Rated maximum voltage	kV	36	
1.5	Rated service voltage	kV	33	
1.6	Lightning impulse withstand voltage *(at altitude less than 1000 M)*	kV peak	170	
1.7	Power frequency 1 min. withstand voltage *(at altitude less than 1000 M)*	kV	70	
1.8	Maximum RIV at 1000 kHz	micro V	500	
1.9	Nominal creepage distance	mm/kV	31	
1.10	Mechanical values:			
1.11	Cantilever	kg	800	
1.12	Tensional strength	kgm	400	
1.13	Weight:	kg	to be specified	
1.14	Accessories:		to be specified	
1.15	Connectors			
1.16	Joints			
1.17	Clamps			
1.18	Applicable Standard(s)		IEC 60016, IEC 60168,	

18

TAC 2

	Post-Type Insulators	Minimum Requirements		Data offered by Bidder
		Unit	Data	
			IEC 60865, IEC 60273 DIN 48 013	

18

8.TECHNICAL DATASHEETS FOR 220/33 KV 75MVA POWER TRANSFORMER

S. N.	220/33 kV POWER TRANSFORMERS			
	Specifications	UNIT	DATA	
			Required	Offered
1.00	POWER TRANSFORMER			
1.01	Manufacturer & Place of manufacturing		To be specified	
1.02	Type designation		To be specified	
1.03	Type		Three phase oil-immersed, core type with tertiary winding	
1.04	Standards		IEC 60076, 60137, 60214	
1.05	Altitude	m	< 1,000	
1.06	Ambient temperature			
	Maximum	°C	40	
	Annual average	°C	30	
1.07	Mounting		Outdoor	
1.08	Rated voltage ratio	kV	220/33	
1.09	Rated frequency	Hz	50	
1.10	Vector group (3 phase group connection)		YNyn0d	
1.11	Cooling - 2-stage		ONAN/ONAF	
1.12	Function of tertiary winding (TV)		Stabilizing	
1.13	Method of earthing			
	HV winding		Solid	
	LV winding		Solid	
	TV winding		Delta connected	
1.14	Type of windings (graded/non-graded)			
	HV winding (Series)		Graded	
	LV winding (Common)		Graded	
	TV winding		Non-graded	

18

S. N.	220/33 kV POWER TRANSFORMERS			
	Specifications	UNIT	DATA	
			Required	Offered
1.15	Rated voltage of windings (Ur)			
	HV winding	kV	220/√3	
	LV winding	kV	33/√3	
	TV winding	kV	33	
1.16	Highest voltage for equipment (Um)			
	HV winding	kV	245	
	LV winding	kV	36	
	TV winding	kV	36	
1.17	Rated lightning impulse withstand voltage at:			
	HV terminals	kV	1050	
	LV terminals	kV	170	
	Neutral terminal	kV	170	
	TV Terminals	kV	170	
1.18	Rated power frequency withstand voltage at			
	HV terminal	kV	436	
	LV terminal	kV	70	
	Neutral terminal	kV	70	
	TV terminals	kV	70	
1.19	Rated lightning impulse withstand voltage at:			
	HV Windings	kV	950	
	LV Windings	kV	170	
	Neutral Windings	kV	170	
	TV Windings	kV	170	
1.20	Rated power frequency withstand voltage at			

S. N.	220/33 kV POWER TRANSFORMERS			
	Specifications	UNIT	DATA	
			Required	Offered
	HV Windings	kV	395	
	LV Windings	kV	70	
	Neutral Windings	kV	70	
	TV Windings	kV	70	
1.21	Rated power with ONAF	MVA	75	
1.22	Rated power with ONAN	MVA	50	
1.23	Rated power of tertiary at site conditions (Full cooling)	MVA	N/A	
1.24	Maximum temperature rise at rated power above ambient at:			
	Windings	°C	55	
	Hot spot of windings	°C	80	
1.25	No-load losses at rated voltage and rated	kW	36	
1.26	Load losses at 75 deg C, and rated frequency:	kW	270	
1.27	Total auxiliary losses at full load	kW	10	
1.28	Maximum current density at rated power:	A/cm2	250	
1.29	Symmetrical short circuit through current (duration 2 s)			
	HV terminals	kA	40	
	LV terminals	kA	31.5	
1.30	Maximum flux density in iron at rated voltage, power frequency and principal tapping:	Tesla	1.6	
1.31	Type of tap changing		On-load (OLTC)	
1.32	Manufacturer of on-load tap changer		To be specified	
1.33	Type designation of on-load tap changer		To be specified	
1.34	Tapped winding		HV	

49

S. N.	220/33 kV POWER TRANSFORMERS			
	Specifications	**UNIT**	**DATA**	
			Required	**Offered**
1.35	Tapping range		+ 10% / -10%	
1.36	Tapping step		1.25%	
1.37	Number of steps (positions)		16 (17)	
1.38	Automatic voltage control		Yes	
1.39	HV - LV Impedance voltage range at 75˚C, rated frequency and full rating and principal tap:	%	12.5	
1.40	Terminal connections (HV, LV, TV)		Through terminal bushings	
	LV terminal		Outdoor bushing (Elephant type)	
	Neutral terminal		Outdoor bushing to Cable	
	TV terminal		Outdoor bushing (Open point only)	
1.41	Bushing Creepage Distance (IEC class IV = 31mm/kV)			
	HV terminal (220 kV)	mm	7595	
	LV terminal (36kV)	mm	900	
	Neutral terminal (36 kV)	mm	900	
	TV terminal (36 kV)	mm	900	
1.42	Current transformers HV-Bushing turrets & Neutral Bushing			
	Number of cores			
	Rated extended primary current			
	Ratio (TR = turns ratio)			
	Class			
1.43	Number of cooler pumps required to be stand by	No		

48

S. N.	220/33 kV POWER TRANSFORMERS			
	Specifications	UNIT	DATA	
			Required	Offered
1.44	Number of stand-by fans	No	One per group	
1.45	Oil			
	Manufacturer		To be specified	
	Type designation		To be specified	
	Standards		IEC 60296	
	Minimum flash point	°C	140	
	Kinetic Viscosity (Max) at 27 deg C	mm2/s	27	
	Maximum dielectric strength for 1 min.	kV	60	
	Dielectric dissipation factor (Tan delta) at 90 deg C (Max)		0.002	
	Acidity (neutralization value)	mgKOH/g	0.05	
	Water Content	ppm	<20	
1.46	Conductor Material (e.g., copper, work hardened copper, etc.)		Copper	
	HV windings		Copper	
	LV windings		Copper	
	TV windings			
	Regulating windings			
1.47	Maximum sound pressure level (NEMA TR1 - 5dB(A))	dB(A)	78	
1.48	Conservator vessel, radiators, fan grilles, control boxes or cubicles and pipework anticorrosion protection		Hot dip galvanized and painted	
1.49	Tank anticorrosion protection		Yes	
1.50	Supply voltage for transformer auxiliaries	V	415/240 AC	
1.51	Control/Protection voltage	V	110 DC	
1.52	Manufacturer quality assurance According to ISO 9000, 9001, 9002, 9003 and 9004		Required	

48

S. N.	220/33 kV POWER TRANSFORMERS			
	Specifications	UNIT	DATA	
			Required	Offered
1.53	Type test certificate to be issued by: Independent laboratory or independently witnessed type test certificate		Yes	

9. TECHNICAL DATASHEETS FOR AUXILLIARY TRANSFORMER

Auxiliary Transformer 33/0.415kV; with 350 kVA auxiliary winding		UNIT	DATA	
			Required	Offered
1.0	Manufacturer & Place of manufacturing			
1.1	Type designation			
1.2	Type		Three phase, oil immersed, core type	
1.3	Standards		IEC 60076-1, -2, -3, -5, -6,-10, NEMA TR1 (Noise)	
1.4	Mounting		Outdoor, wheel	
1.5	Rated voltage ratio	kV	33/0.415	
1.6	Rated frequency	Hz	50	
1.7	Vector group		Dyn11	
1.8	Cooling		ONAN	
1.9	Method of earthing			
	- HV winding		Solid	
	- LV winding		Solid	
1.10	Type (graded/non-graded) of windings			
	- HV winding		Non-graded	
	- LV auxiliary winding		Non-graded	
1.11	Rated voltage of windings			
	- HV winding	kV	33	
	- LV auxiliary winding	kV	0.415	
1.12	Highest voltage for equipment			
	- HV winding	kV	36	
	- LV auxiliary winding	kV	0.433	

45

Auxiliary Transformer 33/0.415kV; with 350 kVA auxiliary winding		UNIT	DATA	
			Required	Offered
1.13	Rated lightning impulse withstand voltage at HV Terminal	kV	75	
1.14	Rated power frequency withstand voltage at			
	- HV terminal	kV	170	
	- LV terminal	kV	70	
	- HV neutral terminal	kV	28	
1.15	Rated power at site conditions	kVA	350	
1.16	Limitation and withstanding of fault current in neutral for 30s	A	1050	
1.17	Maximum temperature rise at rated power at:			
	- Windings	K	55	
	- Hot spot of windings	K	68	
	- Top oil	K	50	
	- Oil at inlet of cooler	K		
	- Oil at outlet of cooler	K		
	- Core	K		
1.18	Temperature rise of winding due to short circuit duration of 2 s and HV side short circuit current of 25 kA - Copper windings - Aluminum windings	 °C °C	 250 200	
1.19	No load losses at rated voltage and rated frequency	kW		
1.20	Load losses at 75□C, and rated frequency, rated power and principal tapping:			
1.21	Maximum current density at rated power:			
	- HV winding	A/mm^2		
	- LV auxiliary winding	A/mm^2		

48

Auxiliary Transformer 33/0.415kV; with 350 kVA auxiliary winding		UNIT	DATA	
			Required	Offered
1.22	Symmetrical short circuit withstand current (duration 2 s) at:			
	- HV terminal	kA	25	
	- LV auxiliary terminal	kA		
1.23	Magnetising current (HV winding)			
	- At 90% rated voltage	A		
	- At 100% rated voltage	A		
	- At 110% rated voltage	A		
1.24	Maximum flux density in core at rated voltage, power frequency and principal tapping	T		
1.25	Type of tap changing		Off-load	
1.26	Type designation of off-load tap changer			
1.27	Tapped winding		HV	
1.28	Tapping range		+5% -5%	
1.29	Tapping step		2.5%	
1.30	Number of steps (positions)		4 (5)	
1.31	Impedance voltage range at 75□C and principal tapping:			
	- At principal tapping		> 4%	
	- At maximum voltage ratio		>4%	
	- At minimum voltage ratio		>4%	
1.32	Resistance of winding at 75□C and principal tapping:			
	- HV side	□/phase		
	- LV auxiliary side	□/phase		

48

Auxiliary Transformer 33/0.415kV; with 350 kVA auxiliary winding		UNIT	DATA	
			Required	Offered
1.33	Zero phase sequence impedance of inter-star windings at 75□C (LV windings open-circuit)	□/phase		
1.34	Zero phase sequence impedance of LV windings at 75□C (inter-star windings open-circuit)	□/phase		
1.35	Terminal connection			
	- HV + HVN terminal Note*: Separable connector, e.g. Euromold or similar		Air-filled cable box*	
	- LV + LVN terminal		Air-filled cable box	
1.36	Isolating link for test purposes (not required if separable connector allows testing)			
	- HV terminal		No	
	- LV terminal		No	
1.37	LV fused switch incorporated in LV terminal box	A	Yes	
1.38	Mounting of current transformer at:			
	- HV terminal		In tank	
	- Neutral terminals		In tank or box	
1.39	Current transformers			
	HV Line			
	- Number of cores			
	- Rated extended primary current			
	- Ratio (TR = turns ratio)			
	• I core			
	• II core	A		
	- Class			

18

Auxiliary Transformer 33/0.415kV; with 350 kVA auxiliary winding		UNIT	DATA	
			Required	Offered
	• I core			
	• II core			
	- Knee point voltage (E_k)			
	• I core	V		
	• II core	V		
	- Exciting current (I_E) at E_k			
	• I core	mA		
	• II core	mA		
	- Rated output (Burden to be 25-100% rated burden)			
	• I core	VA		
	• II core	VA		
	HV Neutral			
	- Number of cores			
	- Rated extended primary current			
	- Ratio (TR = turns ratio)			
	• I core	A		
	• II core			
	• III core			
	- Class			
	• I core			
	• II core			
	• III core			
	- Knee point voltage (E_k)			
	• I core			
	• II core			

KS

Auxiliary Transformer 33/0.415kV; with 350 kVA auxiliary winding		UNIT	DATA	
			Required	Offered
	• III core			
	- Exciting current (I_E) at E_k			
	• I core			
	• II core			
	• III core			
	- Rated output (Burden to be 25-100% rated burden)			
	• I core			
	• II core			
	• III core			
	LV Line (Only AIS connections)			
	- Number of cores			
	- Rated extended primary current			
	- Ratio (TR = turns ratio)			
	• I core			
	- Class			
	• I core			
	- Knee point voltage (E_k)			
	• I core			
	- Exciting current (I_E) at E_k			
	• I core			
	- Rated output (Burden to be 25-100% rated burden)			
	• I core			
	LV Neutral			
	- Number of cores			

Auxiliary Transformer 33/0.415kV; with 350 kVA auxiliary winding		UNIT	DATA	
			Required	Offered
	- Rated extended primary current			
	- Ratio (TR = turns ratio)			
	• I core			
	- Class			
	• I core			
	- Knee point voltage (E_k)			
	• I core			
	- Exciting current (I_E) at E_k			
	• I core			
	- Rated output (Burden to be 25-100% rated burden)			
	• I core			
	Note: All class PX CTs shall have a rated secondary current, I_{SN}			
1.40	Oil:			
	– Manufacturer			
	– Type designation			
	– Standards		IEC 60296	
	– Minimum flash point	°C		
	– Viscosity			
	• At 20°C	mm^2/s		
	• At 50°C	mm^2/s		
	• At 80°C	mm^2/s		
	– Maximum dielectric strength for 1 min	kV		
	– Dielectric factor			

18

Auxiliary Transformer 33/0.415kV; with 350 kVA auxiliary winding		UNIT	DATA	
			Required	Offered
	– Acidity (neutralization value)	mgKOH /g		
1.41	Type of dehydrating breather (Non-sealed transformers)		Silicagel	
1.42	Conductor material (e.g. copper, work hardened copper, etc.):			
	– HV windings			
	– LV windings			
1.43	Conductor insulation:			
	– HV winding			
	– LV winding			
1.44	Calculated thermal time constant	min		
1.45	Thickness of transformer tank			
	- Sides	mm		
	- Bottom	mm		
	- Top	mm		
1.46	Material of transformer tank			
1.47	Thickness of radiator plates	mm		
1.48	Total volume of conservator	litres		
1.49	Masses of transformer			
	- Core and coils	kg		
	- Total mass excluded oil	kg		
	- Oil mass			
	□ in tank	kg		
	□ in radiators	kg		
	total	kg		
	- Total mass	kg		

Auxiliary Transformer 33/0.415kV; with 350 kVA auxiliary winding		UNIT	DATA	
			Required	Offered
1.50	Mass of transformer as arranged for transport (heaviest part)	kg		
1.51	Dimensions of transformer arranged for transport			
	- Height	m		
	- Width	m		
	- Length	m		
1.52	Maximum noise level (to NEMA TR1)	dB	56	
1.53	Conservator vessel, radiators, fan grilles, control boxes or cubicles and pipework anticorrosion protection		Hot dip galvanized and painted	
1.54	Control/Protection voltage	V	110 DC	
1.55	Manufacturer quality assurance		Yes	
	- According to ISO 9000, 9001, 9002, 9003 and 9004			
1.56	Type test certificates to be issued by:			
	- Independent Laboratory or independently witnessed type test certificate		Yes	
1.57	Special Tests to be performed:			
	- Measurement of zero-sequence impedance - Determination of sound levels - Measurement of harmonics of no-load current - Vibration test		Yes No No No	

LS

TECHNICAL DATASHEETS FOR SURVEY EQUIPMENT

1.	POST PROCESSING KINEMATICS & RTK, DGPS SYSTEM WITH INTERGRATED SURVEY CAPABILITIES, COMPATIBLE OFFICE ABD FIELD SOFTWARE AND OTHER ACCESSORIES.		
S/N	SPECIFICATIONS	DATA	
		REQUIRED	OFFERED
i.	**MEASUREMENT ACCURACY (Static Mode)** **a)** Horizontal **b)** Vertical	 3 mm ± 0.1 ppm or better 3.5 mm ± 0.4 ppm or better	
ii.	**BASELINE ACCURACY** a) Horizontal b) Vertical	 <4 mm for 10km <7.5 mm for 10km	
iii.	**FAST STATIC ACCURACY** a) Horizontal b) Vertical	 3mm ± 0.5 ppm 5mm ± 0.5 ppm	
iv.	**BASELINE ACCURACY IN FAST STATIC FOR 10 KM** a) Horizontal b) Vertical	 8 mm with occupation time less than 7.5 minutes 10 mm with occupation time less than 7.5 minutes	
v.	**REAL TIME KINEMATIK SURVEY (RTK)** a) Horizontal b) Vertical	 8 mm ± 1ppm 15 mm ± 1ppm	
vi.	**GNNS RECEIVER**	a) Multiple frequency GNSS receiver with onboard internal memory and SD card slot b) Inbuilt Wifi and WebUI c) The system should have a minimum of	

		400 channels or better and should be capable of tracking GPS + GLONASS + GALILEO. d) GPS: L1C/A, L2C. e) GLONASS: L1C/A, L2C/A f) Beidou: B1 (Phase 2) and B2. g) SBAS: L1C/A h) Systems: SBAS, WAAS and GAGAN **i)** Should be waterproof, shockproof, dustproof, humidity proof and condensation proof.	

2.	**HANDHELD GNNS RECEIVER**			
S/N	**SPECIFICATIONS**	**UNIT**	**DATA**	
			REQUIRED	**OFFERED**
i.	Positional accuracy	cm	1-100 or better	
ii.	Screen size	**inches**	6 or larger	
iii.	Battery life	**hours**	>15 on full charge	
iv.	Operating System		Android 11 or later	
v.	Random Access memory	**gb**	4 or greater	
vi	Flash memory		16 GB (4G) and 8 GB (Wi-Fi model)	
vii.	Memory card slot		MicroSDHC	
viii.	Water resistance		IP67 rated	
ix.	Processor speeds		2.2Ghz or greater.	
3.	**DATA COLLECTOR**			

TAC 2

S/N	**SPECIFICATIONS**	**UNIT**	**DATA**	
			REQUIRED	**OFFERED**
i.	Positional accuracy	m	±1.5 or better	
ii.	Screen size	**inches**	6 or larger	
iii.	Battery life	**hours**	>15 on full charge	
iv.	Operating System		Android 11 or later	
v.	Random Access memory	**gb**	4 or greater	
vi	Flash memory		16 GB (4G) and 8 GB (Wi-Fi model)	
vii.	Memory card slot		MicroSDHC	
viii.	Water resistance		IP67 rated	
ix.	Processor speeds		2.2Ghz or greater.	

II. Drawings

The SLD drawing shall be modified as attached.

i. MSEZ-2022-SS-E-002-220-33kV_Single Line Diagram

III. Section III. Evaluation and Qualification Criteria

1.2 Evaluation of Price Bid

1.2.1 Other Evaluation Criteria (ITB 35.1(d))

The following factors and methods will apply under ITB 35.1 (d):

(a) Operating and Maintenance Costs: *N/A*

(b) Performance Guarantees of the Works

The norms and the minimum/maximum acceptable levels stated in the Employer's Requirements for functional guarantees shall be modified as indicated:

Required Performance Guarantee	Requirement	
	Norm	Minimum/Maximum Acceptable Level
220/33kV, 75 MVA Transformer		
Iron Loss (kW)	36	N/A/39.5
Copper Loss (kW)	270	N/A/297
Auxiliary Loss (kW)	10	11
Low loss conductor ACSR 550mm^2 equiv. canary		
DC resistance at 20 °C,(Ω/km)	0.0504	N/A/0.05544
Drag Factor	0.9	N/A/0.99

For the purposes of evaluation: the following shall apply:

If the value(s) of the performance guarantee(s) of the proposed Works, as provided by the Bidder in Schedule of Guarantees:

(i) meet(s) the Norm specified in the table above, there shall no adjustment to the Bid Price.

(ii) is/ are within the range between the Norm and the Minimum/Maximum Acceptable Level in the table above, for each percentage point that the value of the performance guarantee is deviated from the Norm, the Bid Price shall be adjusted using the methodology stated below:

Each percentage point that the value of the performance guarantee is deviated from the Norm shall be multiplied by the values in the table below and an addition made to the Bid Price.

US Dollar per kW of Guaranteed Loss			
	No Load Loss	**Copper Loss at CMR**	**Auxiliary Loss at CMR**
Main Transformer	9,000	4,000	4,000

(iii) is/are not within the Minimum/Maximum Acceptance Level in table above, the Bid shall be rejected.

IV. Employers Requirements

The Employers' requirement in the indicated sections below shall be modified as indicated.

Section VI -2A clause C.2

Overseas Training

The Contractor shall arrange product training on new switchgear, substation automation system, protection relays, power quality analyzer and telecommunication system for Employer's staff (engineers). The training shall take place during the factory assembling of the switchgear and other equipment ordered. Training duration shall be as indicated below:

- One (1) week for each of the switchgear training (this includes circuit breaker, disconnector/earth switch, CT, CVT, surge arrestor)
- One (1) week for each equipment training (this includes Transformer and Capacitor Banks)
- Two (2) weeks training for substation automation system and protection relays
- One (1) week training for telecommunication system

- Two (2) weeks training for the 33kV Gas Insulated switchgear and system
- Contractor to propose training duration for the power quality analyzer.

The trainings shall be a combined design and operations/maintenance training and shall contain design principles, theoretical and practical (hands-on-training is preferred) sessions. During the training the trainees shall be able to view/ work-on at least the assembling, final adjustments and factory testing/inspection.

The Employer shall approve the Contractor's proposal for the training program.

Eight (8) engineers of the Employer will participate in each of the above training modules. The full cost of the above training including course fee, foreign accommodation and food, round way air fare, visas, transport and daily allowance of USD 200 shall be borne by the Contractor.

Training at Site

Appropriate training shall be provided by the Contractor for ten (10) members of Employer's staff including operators with respect to installation, testing, operation and maintenance of the equipment/system being newly installed. The contractor shall propose a training plan and duration (at least 3 weeks) which shall be subject to Employer's approval.

The contractor shall provide training location, material, food/refreshment and transport throughout the training period.

Section VI -2B clause 3.3

3.3 Software

The Contractor shall provide software for multi-user access through network license server for:

1. AutoCAD Electrical for windows 4 users.
2. ETAP software with two valid licences
3. PSCAD software with two valid licences

All the software should be purchased under Employer's name and upgraded during the duration of the contract and Six (6) year subscription for both software and web services shall be provided.

Software training AutoCAD, ETAP and PSCAD shall be carried out for fifteen (15) personnels of Employer's engineers in Employer's home country for at least 2 weeks for each software.

The contractor shall provide training location, daily subsistence allowance, food/refreshment and transport throughout the training period. The contractor shall provide temporary licenses for all participants and other relevant training materials during the training period.

Section VI-1B-01 clause 1.38.3

1.38.3 Software

The Contractor shall provide softwares for multi user access through network licence server for:

Software Description	No. of Licenses
PLS-CADD w/Optimum Spotting and Finite Element Sag/Tension	Two (2)
PLS-TOWER	Two (2)
PLS-POLE (All inclusive), with integrated CAISSON	Two (2)
Auto CAD	Two (2)

NB: All the software should be purchased under Employer's name and upgraded during the duration of the contract and Six (6) year subscription for both software and web services shall be provided beyond the original contract period (excluding any extensions).

Software training of PLS-CADD w/Optimum Spotting and Finite Element Sag/Tension, PLS-Tower and PLS-Pole by a qualified and authorized Power Line Systems trainers/firm shall be carried out for ten (10) personnel of Employer's engineers in the Employer's home country for at least two (2) weeks for each software.

The contractor shall provide training location, daily subsistence allowance, food/refreshment throughout the training period. The contractor shall provide temporary licenses for all participants and other relevant training materials during the training period.

Section VI-3A clause 11

11.1 Participation in Factory Acceptance Tests

The Contractor shall provide facilities for the participation/witnessing of the factory acceptance tests of the following critical/major items by four (4) representatives/staff of the Employer. The contractor shall bear the costs of return air tickets, hotel accommodation and food, visas, transport, daily allowance of USD 200 and all other costs of the Employer's representatives.

(i) 36kV SF_6 Gas Insulated Switchgear / RMU.

(ii) 33kV XLPE Underground Cable.

(iii) Underground Fiber Optic Cable and accessories.

11.2 Training for Employer's Staff

The Contractor shall arrange product training on the following equipment/items for Employer's nominated personnel.

- 33kV SF6 Gas Insulated Ring Main Unit at manufacturer's shop for one (1) week.
- 33kV XLPE Cable Joint, Termination at manufacturer's shop for one (1) week

The training shall take place during the factory assembling of the switchgear and other equipment ordered.

The Employer shall approve the Contractor's proposal for the training program.

Six (6) engineers of the Employer will participate in each of the above training modules. The full cost of the above training including course fee, foreign accommodation and food, air fare, visas, transport and per diem allowance of USD 200 shall be borne by the Contractor.

Section VI-1A.

3. OTHER SERVICES

3.6 PARTICIPATION IN FACTORY ACCEPTANCE TESTS

The Contractor shall provide facilities for the participation/witnessing of the factory acceptance tests of the following critical/major items by two (2) representatives/staff of the Employer and one (1) representative/staff of the Engineer. Contractor shall bear the costs of return air tickets, hotel accommodation, daily allowance of USD 200 and all other costs of the Employer's representatives.

I. Tower test

II. Low Loss ACSR Conductor

III. OPGW

IV. ACS Earth conductor

V. Insulator string set

VI. Hardware and fittings

Section VI -2A

C. OTHER REQUIREMENTS

1. Participation in Factory Acceptance Tests

The Contractor shall provide facilities for the participation/witnessing of the factory acceptance tests of the following critical/major items by Two (2) representatives/staff of the Employer and one (1) representative/staff of the Engineer. The Contractor shall bear the costs of round air economy tickets, hotel accommodation, daily allowance and all other costs of the Employer's representatives. The period of each FAT will be approved by the

employer but shall not be less than five (5) days.

However, for control and protection / SAS, the minimum period shall be three (3) weeks.

I. 220/33kV 75MVA Transformer

II. 220kV Switchgear -CB, Power transformer condition monitoring system, Disconnecting Switch (DS), CT, VT

III. 220kV Surge Arrester

IV. Reactive Power Compensation Equipment

V. 33kV Gas Insulated Switchgear

VI. Protection, Control, Metering and Fault Monitoring Systems

VII. Substation Automation and Control system

VIII. Telecommunication System

IX. 110vdc and 48vdc Battery Chargers & Batteries

X. Power Quality Analyser

XI. Substation Gantries & Steel Structures.

V. Price Schedule Changes

The price schedule has been revised and excel files attached in Tender Addendum & Clarification No. 2.

B. Clarification No. 2

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
1	Volume I of VII-PART 1 PART 1/88				Kindly request to provide editable version of price schedule and TDS, for example, excel format.	Editable files provided with this TAC 2.
2	Volume II of VII-PART2	PART 2/8		3.1.1 Nominal area per phase 563 mm^2 3.2.6 Total area of conductor 620 mm^2 3.2.7 Overall diameter of stranded conductor 29.5 mm	Kindly clarify the type of conductor with 29.5 mm outer dimeter and all aluminium wires in trapezoidal shape and Aluminium-Clad Steel for inner core shall be used in these projects.	Refer to specification of the conductor provided in Section VI-1B, 02 "Overhead Line Conductors". 2.2 General and Technical Data sheet
3	Volume II of VII-PART 2	PART 2/18	06-Section VI-1B_03_OPGW and Earth Conductor/ 3.3. Technical Schedule	2. 1.14 Short circuit current rating 496 kA^2s	The short circuit current rating 496 kA^2s for OPGW is oversizing and also not matching with the value of ACS earth wire. Kindly clarify if possible to reduce.	Not to be reduced. This is KETRACO's standard design.
4	Clarification No. 1	PART 2/16	08-Section VI-1B_05_Steel Tower Design/ 5.13 Technical Schedule	1.1.1 Maximum working tension per conductor, for purposes of tower design b. Down leads (Slack Span) 5.0 N 1.1.1 Maximum working tension per earth conductor, ACS	There might be some typos here for these 5 Newton or 4 Newton. Kindly clarify this value.	Confirmed, max. working tension (slack span) applied is 5kN for conductor and 4kN for the ACS earth wire.

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
				Earth wire, for purpose of tower design b. Down leads (Slack Span) 4.0 N		
5	Volume II of VII-PART 2	PART 2/22	08-Section VI-1B_05_Steel Tower Design/ 5.13 Technical Schedule	QUALITY OF TOWER MATERIALS 2. Grade/standard: EN10025-2 a. Mild steel S275 b. High tensile steel S355	Kindly clarify if similar steel with equivalent or better performance based on the other standard is acceptable.	Specification Shall prevail
6	Volume I of VII-PART 1	PART 1/IV-C1-7	Schedule No. 3: Supply of Plant (Off-Site)	307. Additional steel work ton 40	Kindly specify the work content of "Additional Steel Work" in Item No. 307	See Section VI, 1B-12 "Remeasured works", where specified how to use it.
7	Volume I of VII-PART 1	PART 1/IV-C1-7	Schedule No. 3: Supply of Plant (Off-Site)	Item 310-1: Single suspension insulator set for single "Canary" completed with clamps, fittings, clevis, armour rod set 654 Item 310-2: Double suspension insulator set for single LL-ACSR "Canary" completed with clamps, fittings, clevis, armour rod set 24	The total number of Single suspension insulator set and double suspension insulator sets should be 654 instead of 654+24 (Considering 109 set tower type 220S)	Quantities in the price schedule are estimated quantities. The contractor will be paid for actual quantities at the unit rate provided in the price schedule.
8	Volume I of VII-PART 1	PART 1/IV-C1-8	Schedule No. 3: Supply of Plant (Off-Site)	Software: PLS-CADD, PLS-Tower, PLS-Pole	The PLS software for design only or should it be provided to the owner.	The software are to be provided to the Employer. See section VI-1B-01, sub clause 1.38.3 of

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
						Tender Addendum & Clarification No. 2
9	Volume V of VII-PART 2	PART 2	31-Section VI-2B-27-Specifications -Civil & Structural Works		Should earthquakes be considered? It is better to clearly give the gust wind speed, the basic geological situation;	This information is provided under Section VI, -2A and VI-2B "Specifications-Civil and Structural works", sub clause 1.1.14.
10	Volume V of VII-PART 2	PART 2	31-Section VI-2B-27-Specifications -Civil & Structural Works		Whether there are special requirements in the design and analysis of structures, such as unconventional safety coefficients, in foundation design, in addition to the conventional calculations	sub clause 1.1.1.1.4 gives a reference document for design loads.
11	Volume V of VII-PART 2	PART 2	31-Section VI-2B-27-Specifications -Civil & Structural Works		For the local building facade style requirements, can give the actual project as a reference	Refer to the specification for various finishes given in Section VI-2B: Specifications - Substations 27 - Civil & Structural Works and drawing no. MSEZ-2022-SS/E-009.

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
12	Volume V of VII-PART 2	PART 2	31-Section VI-2B-27-Specifications-Civil & Structural Works-20230704		Please inform us of the form in which the source of domestic water is used? Is it allowed to dig a well for water	See Section VI-2A-B, sub-clause 1.11.1 "Water Supply System" for that applicable to Employer. For construction use, Contractor shall be responsible for identifying and sourcing for suitable water for works. Related costs shall be deemed to be part of the contract price. (Section VI-1B-01, sub-clause 1.37.2)
13	Volume III of VII-PART 2	PART 2	04-Section VI-2B-i-Specifications-Scope and Preliminary General Requirements	For the Extended Substation	Please provide the brand and model of equipment of the existing substation control system, the brand and model of communication equipment, and the telecommunication protocol with the dispatching centre	See Section VI-2A-2 "Mariakani 400/220kV Substation (Extension) Sub clause 2.2 as well as Fibre Optic Link 1 of 2 Drawing. Detail drawing/ specification will be handed over to successful bidder only.
14	Volume III of VII-PART 2	PART 2	04-Section VI-2B-i-Specifications-Scope and Preliminary General Requirements	For the Extended Substation	Please provide the brand and model of equipment of the existing substation relay protection system, especially the busbar protection and line protection devices	Busbar protection Relay for Existing Mariakani 220kV, manufactured by GE Grid Solution Type MULTINLIN B90

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
15	Volume III of VII-PART 2	PART 2	04-Section VI-2B-i-Specifications -Scope and Preliminary General Requirements	For the Extended Substation	Please provide the brand and model of equipment of the existing substation power metering system, including the power meter and power quality monitoring device	Detail drawing/specification/Model will be handed over to successful bidder only.
16	Volume I of VII-PART 1	Volume I - PART 1_20231227.pdf/214	GUARANTEED TECHNICAL PARTICULARS	3.TECHNICAL DATASHEET FOR 33 KV INSULATORS	The parameter seems to require 132kV insulator, please confirm.	Revised technical data sheet for 33kV Insulators provided as an Tender Addendum & Clarification No. 2. *(3. Technical Datasheet For 33 kV Insulators)*
17	Volume I of VII-PART 1	Volume I - PART 1_20231227.pdf/228-229	GUARANTEED TECHNICAL PARTICULARS	8.TECHNICAL DATASHEETS FOR 220/33 KV 75MVA POWER TRANSFORMER	1.17 Rated lightning impulse withstand voltage at HV is 1050kV 1.19 Rated lightning impulse withstand voltage at HV is 950kV Please clarify this inconformity	Item no. 1.17 refers to BIL at bushing terminal, whereas item no.1.19 refers to BIL at winding. The difference is due to creepage distance of bushing.
18	Volume I of VII-PART 1	Volume I - PART 1_20231227.pdf/230	GUARANTEED TECHNICAL PARTICULARS	8.TECHNICAL DATASHEETS FOR 220/33 KV 75MVA POWER TRANSFORMER	1.41 Bushing Creepage Distance not enoughFor example, HV terminal (220 kV)=245kV*31mm/kV=7595mm, not 6125mmPlease clarify	Confirmed. Creepage distance of HV bushing shall be 7,595mm. Tender Addendum & Clarification No. 2. *(8. Technical Datasheet For 220/33Kv 75MVA Power Transformer)*

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
19	Volume I of VII-PART 1	Volume I - PART 1_20231227.pdf	GUARANTEED TECHNICAL PARTICULARS	9.TECHNICAL DATASHEETS FOR AUXILLIARY TRANSFORMER	1.14 Rated power frequency withstand voltage Seems to be low, not enough, please clarify.	Confirmed. Rated lighting impulse withstand voltage is 170kV and power frequency withstand voltage is 70kV for the 33kV side. Tender Addendum & Clarification No. 2 *(9. Technical Datasheet For Auxilliary Transformer)*
20	Volume III of VII-PART 2	PART 2/ 20	04-Section VI-2B-i-Specifications -Scope and Preliminary General Requirements	3.10 Service Conditions c. Earthquake loading for design purposes an earthquake loading of 0.15 shall be assumed.	Please kindly clarify earthquake loading is 0.15g or 0.15	Earthquake loading is 0.2g. See Section VI-2A-B "Civil Engineering Requirement". 0.2g is applied based on seismic map of Kenya (WHO). 0.2 g is the ground acceleration. 0.2 is loading factor determined from ground acceleration.
21	Volume III of VII-PART 2	PART 2/ 55	10-Section VI-2B-06-Specifications -Power Transformer	1.0 220/33 kV POWER TRANSFORMERS 1.22 Rated power with ONAN 50MVA	TDS requires ONAN to be 50MVA, while the 4-MSEZ-2022-SS-E-002-220-33kV Single Line Diagram drawing requires 55MVA. Please confirm.	ONAN rating shall be 50MVA, updated single line diagram Tender Addendum & Clarification No. 2. *(8. Technical Datasheet For 220/33Kv 75MVA Power Transformer).*

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
22	Volume III of VII-PART 2	PART 2/ 6	08-Section VI-2B-04-Specifications -Instrument Transformers / 4.1.4. Voltage Transformers for Tariff Metering	The VT secondary shall be of class 0.2s conforming to IEC 61869-3 for a wound VT. VT dimensioning calculation shall be provided to demonstrate the supplied burden is adequate and will operate within the accuracy parameters defined in IEC 61869.	The VT secondary winding does not have class 0.2s, please confirm if it is class 0.2	Confirmed. VT secondary winding is class 0.2.
23	Volume III of VII-PART 2	PART 2/ 8	11-Section VI-2B-07-Specifications -Auxiliary Transformer/ 7.5 TECHNICAL DATASHEETS FOR AUXILLIARY TRANSFORMER	1.15 Rated power at site conditions 250kVA	TDS requires the auxiliary transformer capacity of 250kVA, while 4-MSEZ-2022-SS-E-002-220-33kV Single Line Diagram drawing requires 350kVA. Please confirm.	Auxiliary transformer's capacity shall be calculated by the Contractor, based on the station Auxiliary loads for the substation, but minimum capacity shall be 350kVA. Tender Addendum & Clarification No. 2 *(9. Technical Datasheet For Auxilliary Transformer).*
24	Volume III of VII-PART 2	PART 2/ 8	11-Section VI-2B-07-Specifications -Auxiliary Transformer/ 7.5 TECHNICAL	1.13 Rated lightning impulse withstand voltage at HV Terminal 75kV 1.14 Rated power frequency withstand voltage at HV Terminal 28kV	The rated voltage of the auxiliary transformer HV terminal is 33kV. Referring to Table 2 of IEC60071-2011, Standard rated short duration power-frequency withstand voltage of 33kV is 70kV, and Standard rated lightning	Refer to response in clarification No. 19.

VB

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
			DATASHEETS FOR AUXILLIARY TRANSFORMER		impulse withstand voltage is 170kV. Please confirm.	
25	Section II. Bid Data Sheet	ITB 11.2 (j) Page BDS-3		The Bidder shall submit the following additional documents in its Technical Bid: 1. Documents proving their eligibility for registration with NCA (National Construction Authority) class 1 in Kenya.	Our Understanding is that after we are awarded based upon our qualification credentials, we can register in Kenya for NCA Class 1. Now we submit a copy of our Contractors Class 1 License from our country of origin. Is our understanding correct?	Confirmed. Your understanding is correct.
26	Volume ISection II. Bid Data Sheet	ITB 14.9 (a) (ii)Page BDS-4		"Pay & Reimburse" category: It states that the Contractor first makes all payments arising from or out of or in connection with such liabilities and then apply for their reimbursement from the relevant authority, following the procedure prescribed by such authority.	For imported materials, if the duties / taxes are to be paid – what currency is it KSH or the currency with which the materials are procured. Please clarify.	Subject to provisions in BDS ITB 14.9. If duties/taxes are payable, they are to be settled in Kenya Shillings and not foreign currency.
27	Volume I Section II. Bid Data Sheet	ITB 14.9 (c) Page BDS-4		KETRACO has duty of collecting withholding tax from contractors on behalf of Kenya Revenue Authority	How is the reimbursement done is not stated? Kindly clarify.	Refer to the provisions under BDS ITB 14.9.

AB

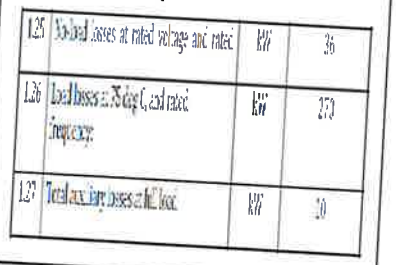
No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
				under the Kenyan Income Tax Act.		
28	Volume I Section II. Bid Data Sheet	ITB 16.2(b) Page BDS-6		The period after the taking-over of the Works by the Employer, for the Bidder to propose spare parts (i.e. Mandatory Spare Parts and Recommended Spare Parts, if required), special tools, etc.: Two (2) years	Should we take the cost into consideration or only have a list to be given? Kindly clarify.	Refer to Vol 1-Part 1_Section IV. Price Schedules Schedule No. 7: Recommended Spare Parts (Notes for the bidders) and Section VIII Particular Conditions (Part B Specific Provisions Sub-clause 7.9)
29	Volume III Section VI-2A Scope of Supply of Plant and Installation Services by the Contractor	VI-2A-45		C. OTHER REQUIREMENTS 1. Participation in Factory Acceptance Tests (iv) Reactive Power Compensation Equipment	Kindly confirm that the item (iv) Reactive Power Compensation Equipment is not a scope of the project	Reactive Power Compensation Equipment is part of the project scope. Refer to VI-2B-26

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
30	Volume III Section VI-2A Scope of Supply of Plant and Installation Services by the Contractor	VI-2A-45		C. OTHER REQUIREMENTS 2. Training for Employer's Staff Overseas Training RFQ stated that "The Contractor shall arrange product training on new switchgear, substation automation system, protection relays, power quality analyser and telecommunication system for Employer's staff (engineers)."	Kindly specify if the new switchgear stands for 220kV gas circuit breaker, 220 kV disconnector, 220kV Earthing Switch, 220 kV current transformer and 220 kV capacitive voltage transformer	Confirmed, but Surge Arrestor, breaker switch capacitor units and 33kV Gas Insulated Switchgear are also considered as switchgear Take note of additional information in Tender Addendum & Clarification No. 2.
31	Volume III Section VI-2A Scope of Supply of Plant and Installation Services by the Contractor	VI-2A-45		C. OTHER REQUIREMENTS 2. Training for Employer's Staff Overseas Training RFQ stated that "The training shall take place during the factory assembling of the switchgear and other equipment ordered." .	Kindly specify what product "other equipment ordered" does expect	Refer to revisions made in Tender Addendum & Clarification No. 2

KS

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
32	Volume III Section VI-2A Scope of Supply of Plant and Installation Services by the Contractor	VI-2A-45		C. OTHER REQUIREMENTS 1. Participation in Factory Acceptance Tests 2. Training for Employer's Staff Overseas Training RFQ in 1. Participation in Factory Acceptance Tests, specified "However for control and protection /SAS, minimum period is 3 weeks." In addition, RFQ in 2. Training for Employer's Staff, Overseas Training, specified that "Training duration shall be at least Three (3) weeks for each of the switchgear, substation automation system, protection relays and telecommunication system training".	Kindly clarify if minimum 6 weeks (3 + 3) for combined the training and the factory acceptance test of control and protection/SAS & minimum 3 + necessary weeks which will be approved by the employer for combined the trainings and the factory acceptance test of equipment which will be specified by the employer as per the clause 5 and 6 in the clarification except control and protection/ SAS.	Refer to revisions made in Tender Addendum & Clarification No. 2

45

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
33	Volume IIISection VI-2BSpecifications–Substations06-Power Transformer	Page VI-2B-06-54		220/33 kV POWER TRANSFORMERS (Data Sheet) 	kindly check and advise whether above Loss values are max or not. Also do we have option to quote optimise losses or we need to offer exactly same loss values.Also check and advise do we have any Capitalization rates for Loss evaluation, or the employer will not give any preference for lower loss values than above specified.	Take note of the revised Guaranteed Technical Particulars and Employer's Requirements for functional guarantees (Section III, Evaluation and Qualification Criteria, sub-clause 1.2. 1 (b)) in Tender Addendum & Clarification No. 2 above. For capitalization rates: • during tender evaluation refer to sub-clause 1.2. 1 (b) –(ii) Evaluation of Price Bid in Section III, Evaluation and Qualification Criteria, and • during implementation after FAT refer to Schedule of Guarantees in Section IV, Technical Data Sheets.
34	Volume I Section II. Bid Data Sheet Volume I	ITB1.1 Page BDS-1 Front Page		IFB number: KETRACO/PT/003/2023 is mentioned but in the front page of tender document, IFB number: KETRACO/PT/045/2023 is mentioned	Please clarify which number to be used	IFB number is KETRACO/PT/045/2023.

No.	Volume	Part / Page	Section / Clause No.	Reference	Clarification	Reply from KETRACO
	Front Page					
35	General				Kindly provide CAD data for substation layout and route map, and also kindly provide editable Bidding Forms.	Editable Bidding Forms have been provided, all drawings are in pdf format only.
36			Section VI-1B_02_Overhead Line Conduct Sub clause 2.2. General	The line conductor shall be supplied on steel or wooden drums which are constructed in accordance with an approved national standard so as to enable the conductor to be run out smoothly and in lengths as long as can be conveniently handled and erected.	Confirm if conductors can be supplied on wooden drums.	Conductor, OPGW and GSW shall be supplied on Steel drums only.