

**Our Ref: KETRACO/PT/043/2023**

**12<sup>th</sup> January, 2024**

**Notice to all Bidders**

**RE: TENDER ADDENDUM AND CLARIFICATION 2**

**RE: TENDER FOR SUPPLY OF ONE (1) 23MVA 132/33KV POWER TRANSFORMER (KETRACO/PT/043/2023)**

The following amendments are made to the specified provisions of **Tender for Supply of One (1) 23MVA 132/33kV Power Transformer (Tender Number KETRACO/PT/043/2023)**. 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 ADDENDUM AND CLARIFICATION No. 2, consisting of three (3) pages into the Principal Tender Documents as attached. This document should be returned along with dully filled Form of Tender.

No	Clause	Clarification	KETRACO Response
1	Technical Specifications	Addition of Bushing CTs Requirement and Specifications	Bushing CTs shall be provided as indicated in Appendix I
2	Technical Specifications, Technical Data Sheet	Can you please provide the required No-Load Losses and Load Losses.  And can you please specify how you will evaluate the bids if bidders offer various losses.	For purposes of Power Loss Evaluation, the criteria has been updated as attached in Appendix II. Also see updated Technical Datasheet.
3	Tap changer Specification	Clause 5.3.10. Voltage Control on the specifications requires that the OLTC be from MR. The MR VV series max. step voltage is 2000V. Tapping range required as per the TDS item no. 21 is $\pm 8 \times 1.67\%$ which translates to 2204V per step (total 17635V for 8 steps) in Delta configuration which is beyond the 2000V step voltage for the MR three phase tap changer. For the star configuration, the step voltage is $132/\sqrt{3} \times 1.67\% = 1273\text{V}$ per step. Could it be acceptable to change the tapping range to $\pm 11 \times 1.25\%$ which translates to 1650V per step (total 18150V for 11 steps) within the step voltage of MR Vacuum OLTC.	Tapping range shall be $\pm 8 \times 1.67\%$ . Step voltage may be manufacturer specific to be detailed in the submitted documentation.

		Or confirm it is acceptable to use 3no. Single phase tap changers with step voltage of 3300V (model VM I) to achieve the $\pm 8 * 1.67\%$ step voltage of 2200V.	
4	Technical Specifications 5.3.7	Also, kindly confirm that a different brand of oil used by the transformer manufacturer that meets the requirements of IEC 60296 can be supplied since not all OEM have the brands Shell Diala "B" and Nynas Nitro GBN10 I their country.	Oil to comply with IEC 60296(Class 1; un-inhibited oil). Tenderer to provide chemical composition and properties of oil.
5	Technical Specifications 6.9 Site Preparation and Delivery	<i>"The transformer tank placed on treated wooden electric poles laid on the ground."</i> The supply of Wooden poles will be in KETRACO scope or in Bidder's scope?	To be supplied by bidder.
6	Scope of the tender - Design, Manufacture, FAT, Packing, Transport, Insurance, Site Preparation and offloading at site.	Kindly clarify if the scope is inclusive of installation, testing and commissioning.	Installation, testing and commissioning not inclusive. Due Diligence may be done by the employer if necessary at the Employers cost.
7	Tender closing date.	Closing date of this tender is 23rd January 2024. Kindly extend the closing date to 31st January 2024.	Tender closing date is extended to Wednesday 31 <sup>st</sup> January 2024 at 10.30am EAT

All other terms and conditions of the tender document remains the same.

**USER REPRESENTATIVE: GILBERT MILGO**

SIGNATURE.....

APPROVED BY:  


**PETER NJEHIA**  
**SENIOR MANAGER, SUPPLY CHAIN MANAGER**

Tender Addendum and Clarification No. 2 of Tender No. KETRACO/ST/043/2023 has been received and incorporated in the Tender Documents.

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

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**Signature:**

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**Date:**

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

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**In the office bearer  
capacity of:**

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## Appendix I

### Bushing Current Transformer specifications for 23MVA 132/33kV Transformers

PHASE	CORE	BURDEN	RATIO	CLASS
<b>HV Side(132kV)</b>				
R	1	30VA	400/200/1A	5P20
	2	30VA	400/200/1A	5P20
	3	30VA	400/200/1A	PX
	4	15VA	400/200/1A	0.5
Y	1	30VA	400/200/1A	5P20
	2	30VA	400/200/1A	5P20
	3	30VA	400/200/1A	PX
	4	15VA	400/200/1A	0.5
B	1	30VA	400/200/1A	5P20
	2	30VA	400/200/1A	5P20
	3	30VA	400/200/1A	PX
	4	15VA	400/200/1A	0.5
<b>LV Side(33kV)</b>				
r	1	30VA	400/1A	5P20
	2	30VA	400/1A	5P20
	3	30VA	400/1A	PX
	4	15VA	400/1A	0.5
y	1	30VA	400/1A	5P20
	2	30VA	400/1A	5P20
	3	30VA	400/1A	PX
	4	15VA	400/1A	0.5
b	1	30VA	400/1A	5P20
	2	30VA	400/1A	5P20
	3	30VA	400/1A	PX
	4	15VA	400/1A	0.5
n	1	30VA	400/200/1A	PX
	2	30VA	400/200/1A	5P20

- Current transformers of suitable rating and class for winding temperature indicators shall be installed in the bushing turrets.
- Current transformers shall comply with the requirements of IEC 60044/IEC 61869.
- Full technical particulars of CTs offered including type test reports from and international reputable Testing Authority or National Standards and Testing Authority of the country of manufacture shall be submitted with the tender.



## Appendix II

### Transformer Loss Capitalisation

The transformer losses shall be capitalised at the following rates to facilitate evaluation and comparison of tenders;

Total load losses, ONAF rating (copper loss stray loss) at rated current at 75°C in KW, including auxiliary losses	US\$ 2577 per kW for 35 years
Total no load losses in KW (Core loss + Dielectric loss)	US\$ 4339 per kW for 35 years

Losses will be capitalised at the above rates and added to the price according to the formula below:

$$Gep = Gbp + G(\$)$$

Where;

$$Gep = \text{Bid Evaluation Price}$$

$$Gbp = \text{Bid Price}$$

$G(\$)$

= Adjustment for the cost of the operation and maintenance for 35 years (in USD)

Formula for  $G(\$)$  is as below;

$$G(\$) = \text{US\$ } 2577 \times (\text{Total load losses, ONAF rating (copper loss + stray loss) at rated current at } 75^\circ\text{C in KW, including auxiliary losses}) \\ + \text{US\$ } 4339 \times (\text{Total no load losses in KW (core loss + dielectric loss)})$$

The guaranteed transformer losses used in the above capitalisation formula shall be the maximum allowed and no plus tolerance shall be allowed during acceptance testing.





## 9.1. TECHNICAL DATA SHEET (TDS)

**Table 9.2:** 23 MVA, 132/33 kV Power Transformer TDS

No.	Description	Unit	Data	
			Required	Offered
1	Manufacturer's name		to be specified	
2	Country of Manufacture			
3	Type		3-phase, oil-immersed, with on-load tap changer	
4	Installation		outdoor	
5	Rated maximum voltage (Primary / Secondary)	kV	145 / 36	
	Rated service voltage			
6	Primary side (high voltage)	kV	132	
7	Secondary side (low voltage)	kV	33	
	Rated no-load voltage at rated frequency on:			
8	HV, principal tapping	kV	to be specified	
9	HV, extreme plus tapping	kV	to be specified	
10	HV, extreme minus tapping	kV	to be specified	
11	LV	kV	to be specified	
12	Rated power ONAF primary/secondary [Performance Guarantee]	MVA	23/ 23	
13	Rated power ONAN primary/secondary [Performance Guarantee]	MVA	18/ 18	
14	Rated frequency	Hz	50	
	Rated current			
15	Primary side (high voltage)	A	to be specified	
16	Secondary side (low voltage)	A	to be specified	
17	Vector group		<b>Dyn11</b> with provision for change of connection to <b>Dyn1</b>	
	Impedance voltage of:			
18	ONAF centre tap	%	11.5	
19	Insulation		uniform	
20	Type of cooling		ONAN/ ONAF	
21	Tapping range		$\pm 1.67\%$ in $\pm 8$ steps	

No.	Description	Unit	Data	
			Required	Offered
22	Total No-load losses (Core loss+ dielectric loss) at rated frequency and 100% voltage - maximum value [Performance Guarantee]	kW		
	Total Load losses (Copper loss+ Stray loss) at rated frequency and 100% voltage (75°C) - maximum value: [Performance Guarantee]			
23	i)For ONAN rating	kW		
24	ii)For ONAF rating (including auxiliary losses)	kW		
	iii)Auxilliary losses	kW		
25	Material of winding		Electrolytic copper	
	Temperature rise at rated power over 40°C maximum ambient [Performance Guarantee]			
26	oil (upper level)	°C	45	
27	winding	°C	55	
28	Rated power frequency withstand voltage HV/LV	kV	275/70	
	Rated lightning impulse withstand voltage:			
29	HV windings	kV peak	650	
30	LV windings	kV peak	170	
	Short circuit impedance referred to the first winding in the following pairs: [Performance Guarantee]			
31	At principal tap: high voltage - low voltage	W / phase	to be specified	
32	At extreme plus tap: high voltage - low voltage	W / phase	to be specified	
33	At extreme minus tap: high voltage - low voltage	W / phase	to be specified	

No.	Description	Unit	Data	
			Required	Offered
34	Maximum noise level (Lp) [Performance Guarantee]	dB (A)	70	
35	Maximum no-load current	% In	0.2	
36	Painting		Admiralty Grey shade No. 632 as per BS 381C	
	Dimensions			
37	length	mm	to be specified	
38	width	mm	to be specified	
39	height	mm	to be specified	
40	distance between wheels' centres	mm	to be specified	
41	Total weight	kg	to be specified	
42	Oil weight	kg	to be specified	
43	Applicable standard(s)		IEC 60076	
	Transformer Bushings			
	Maximum current carrying capacity of bushings:			
44	HV	A	120% of IN	
45	LV	A	120% of IN	
	Rated service voltage of bushings:			
46	HV	kV	132	
47	LV	kV	33	
48	HV, neutral	kV	to be specified	
49	LV, neutral	kV	to be specified	
	1 minute, 50 Hz dry withstand voltage:			
50	HV bushing	kV	to be specified	
51	LV bushing	kV	to be specified	
52	TV bushing	kV	to be specified	
53	HV, LV neutral bushings	kV	to be specified	

No.	Description	Unit	Data	
			Required	Offered
	1 minute, 50 Hz wet withstand voltage:			
54	HV bushing	kV	to be specified	
55	LV bushing	kV	to be specified	
56	TV bushing	kV	to be specified	
57	HV, LV neutral bushings	kV	to be specified	
	Impulse withstand voltage:			
58	HV bushing	kV	to be specified	
59	LV bushing	kV	to be specified	
	On-Load Tap Changer			
60	Manufacturer's name		Maschinenfabrik Rheinhausen (MR) - Germany	
61	Type		Vacuum	
62	Rated current	A	175	
	Rated short-time current			
63	1 second (maximum)	kA	31.5	
64	3 s	kA	to be specified	
65	Step voltage	V	to be specified	
66	Number of steps		17	
67	On-load tap changer		$\pm 8 \times 1.67\%$	
68	Minimum number of operations	operations	200,000	
	Motor drive			
69	Type		to be specified	
70	Supply voltage	V AC	415/240	
71	Insulation level voltage to earth	kV rms	to be specified	
	Insulation level			
72	Voltage to earth	kV rms	to be specified	
73	Impulse test voltage	kV peak	to be specified	
74	One-minute power frequency test voltage (50 Hz)	kV rms	to be specified	
	Internal insulation levels / one-minute power frequency test voltage:			

No.	Description	Unit	Data	
			Required	Offered
75	between selected and pre-selected tap	kV peak	to be specified	
76		kV rms	to be specified	
77	across fine tap winding	kV peak	to be specified	
78		kV rms	to be specified	
79	between phases of fine tap winding	kV peak	to be specified	
80		kV rms	to be specified	

