

PROJECT NUMBER	2.KUMA	MANUFACTURER	Powertech
STATION NAME	UITKYK TRFR 2	TYPE	Transformer
PROJECT MANAGER	Lebo Maune	RATING (MVA)	20
ENGINEERING	Boitumelo Nkoyi	RATIO (kV)	132/22KV
CUSTOMER	DX Mpumalanga	SERIAL NUMBER	W18161653
DATE ARRIVED	2025/07/02	SCOPE OF WORK	Untank & inspect

ACTION	DESIGNATION	NAME	SIGNATURE	DATE
COMPILED BY:	Snr Technician Engineering	Boitumelo Nkoyi		2026/02/16
REVIEWED BY:	Senior Engineer	David Hayes		
ACCEPTED BY:	Project Manager	Lebo Maune		03/03/2026
APPROVED BY CUSTOMER:	Snr Project Advisor	Percy Kamanga		25/02/2026

REMARKS / COMMENTS

		Business Management System Transformer & Switchgear Services Engineering Scope of Work		Document Identifier	240-94063834	Rev	3
				Effective date	04/10/2023		
				Review date	04/10/2028		
				Page	2 of 6		
Item	Activity Description	Reference(s)	Document(s)				
1	WINDINGS MANUFACTURE						
2	Redesign windings and compile winding specifications						
3	Manufacture 3 new tapping windings as per winding specifications	240-94064354					
4	Manufacture 3 new HV windings as per winding specifications	240-94064354	240-94063680				
5	Manufacture 3 new LV windings as per winding specifications	240-94064354	240-94063680				
6	Manufacture associated winding insulation as per winding specifications	240-94064354	240-94063680				
7	Place windings under hydraulic press and apply compacting pressure	240-94064354	240-94063675				
8	Take paper sample for DP analysis	F-738	cate supplied by C				
9	Test continuity and parallel path on every winding	240-94064354	240-94064036				
10	Dry out windings until < 0.8 % water is achieved	240-94064354	240-94063680				
11	Take paper sample for DP analysis	F-738	cate supplied by C				
12	Apply assembly pressure and make adjustments as per winding specifica	240-94064354	240-94063675				
13	Test continuity and parallel path on every winding	240-94064354	240-94064036				
14	Conduct final inspection and deliver windings to the assembly section	240-94064354	240-94063680				
15	ASSEMBLE ACTIVE PART						
16	Clean core and test insulation resistance						
17	Lay core flat	240-102722919	240-94064262				
18	Supply and fit new core insulation	240-101507295	240-94064270				
19	Test IR megger core insulation	240-65216748	H-919,				
20	Refix core to turning gear, lift upright and place on suitable support	240-101507295	94064262 200T/6				
21	Apply varnish to the core laminations						
22	Supply and fit new blocking, press frames and insulation	240-102722919	94064262 200T/6				
23	Fit bottom blocking and support structures referring to drawings	240-102722919	240-94064262				
24	Fit windings to core referring to drawings	240-102722919	240-94064262				
25	Fit top blocking and press rings referring to drawings	240-102722919	240-94064262				
26	Fit top core clamps	240-102722919	240-94064262				
27	Supply and fit new top core insulation	240-102722919	240-94064273				
28	Pre-dry active part in oven until < 0.8 % dryness is reached	240-94065380	cate supplied by C				
29	Retension windings as required for core stacking	240-102722919	94064262 200T/6				
30	Pack 1/3 of the top yoke	240-101507295	94064262 200T/6				
31	TEST ACTIVE PART AFTER PACKING 1/3 YOKE	240-65216748	917, 240-9406427				
32	Test ratio	240-65216748	917, 240-9406427				
33	Test magnetization	240-65216748	H-919, H-917				
34	Test IR megger core insulation	240-65216748	H-919,				
35	Complete packing of top core	240-102722919	240-94064262				
36	Supply and fit new leads and harnesses HV	240-101507295	240-94064271				
37	Supply and fit new leads and harnesses LV	240-101507295	94064262 200T/6				
38	Supply and fit new tapping leads and hanesses	240-101507295	240-94064272				
39	Supply and fit new tapping lead protection wrap at all clamping points	240-102722919					
40	Fit harnessing and make temporary connections	240-102722919	240-94064262				
41	TEST ACTIVE PART AFTER PACKING FULL YOKE	240-65216748	917, 240-9406427				

Item	Activity Description	Reference(s)	Document(s)
42	Test ratio	240-65216748	917, 240-9406427
43	Test polarity	240-65216748	917, 240-9406427
44	Test magnetization	240-65216748	H-919, H-917
45	Test IR megger core to earth	240-65216748	H-919
46	Make and tape final connections	240-102722919	240-94064262
47	TEST PERMANENT HARNASS CONNECTIONS	240-65216748	917, 240-9406427
48	Test ratio	240-65216748	917, 240-9406427
49	Test polarity	240-65216748	917, 240-9406427
50	Test resistance	240-65216748	876, 240-9406406
51	Test magnetization	240-65216748	H-919, H-917
52	Test impedance	240-65216748	H-919, H917,
53	Test IR megger core insulation; core to core clamps; windings to core; wi		
54	Pre-tank active part	240-94065316	
55	Pre-fit tapchanger	240-94065316	
56	Test ratio	240-65216748	917, 240-9406427
57	Check clearances		
58	Resize tapping leads		
59	Pre-fit bushings	240-94065316	
60	Remove tapchanger	240-94065316	240-94064264
61	Untank active part		
62	Final dry active part in vapour phase until < 0.5 % dryness is reached	240-94065380	cate supplied by C
63	Take paper sample for DP analysis	F-738	cate supplied by C
64	Final jack and tighten all parts	240-94065180	
65	Test IR megger core insulation; core to core clamps; windings to core; wi		
66	Place active part in a pot over night	240-94065316	
67	BOILERSHOP WORK		
68	Manufacture blanking plates as required	240-94065612	Notes on Drawing
69	Prepare/Grind tank and cover for re-welding		
70	Fit temporary main cover clamps	240-94065180	240-94064264
71	Weld top cover and allow 24 hrs standing time to check for leaks	103262975 and Dra	Notes on Drawing
72	Blank off and flush/pressurize transformer with nitrogen for welding of t	240-94065316	240-94064264
73	Pressurize transformer with dry air to 25kPa and monitor with daily pres	240-94065431	240-129325372
74	REFURBUSH TANK AND PARTS		
75	Clean, inspect and regasket tank	240-94065180	240-94064264
76	Clean, flush and leak test conservator tank	240-94065382	240-94064264
77	Clean oil level gauge/indicator and fit new seals.		
78	Regasket conservator tank	240-94065382	240-94064264
79	Supply and fit new breathers	240-94065180	240-94064264
80	Supply and fit new Buchholz isolation valves	240-94065382	240-94064264
81	Clean, inspect, flush and seal all pipe work, headers etc.	240-94065382	240-94064264
82	Supply and fit new valves on piping	240-94065382	240-94064264

Item	Activity Description	Reference(s)	Document(s)
83	Supply and fit new BMT drain valve	240-94065180	240-94064264
84	Supply and fit new filtration valve	240-94065382	240-94064264
85	Clean, flush and leak test radiators	240-94065380	1064102 240/940
86	Regasket Radiators		
87	Supply and fit new bleeding plugs		
88	Supply and fit new Buchholz relay	240-94065382	240-94064264
89	Supply and fit new Buchholz oil sampling valve	240-94065382	240-94064264
90	Supply and fit new copper tubing for oil sampling	240-94065382	
91	Supply and fit new pressure relief devices	240-94065382	240-94064264
92	Overhaul marshalling kiosk	240-94065382	
93	Supply and fit new cables	240-94065382	240-94064264
94	Supply and fit new bolts and nuts where required	240-94065180	240-94064264
95	PAINTING OF TRANSFORMER AND PARTS	240-99526023	
96	Seal all parts as required before cleaning	240-99526023	
97	Sandblast tank	240-99526023	
98	Tilt tank to enable painting the base underneath	240-99526023	240-94065316
99	Clean and abrade surfaces prior to painting	240-99526023	
100	Paint tank base	240-99526023	
101	Test paint thicknesses	240-99526023	
102	Bring tank to upright position again	240-99526023	
103	Clean and abrade surfaces prior to painting	240-99526023	
104	Paint tank and parts cloud grey	240-99526023	
105	Test paint thicknesses	240-99526023	
106	Remove all protection applied (masking tape,etc)	240-99526023	
107	BUSHINGS HV		
108	Clean and re-use bushings	240-119807551	240-94063922
109	Test bushing partial discharge	IEC 60137	ster from bushing
110	Test bushing dissipation factor (tan-delta) and capacitance	IEC 60137	Section) (to regist
111	INSULATORS	240-119807551	240-94063920
112	Check and inspect insulators	240-119807551	240-94063920
113	Clean all insulator shells	240-119807551	240-94063920
114	Supply and fit new insulator seals and gaskets	Drawing Number	Drawing Number
115	Assemble insulator	240-119807551	240-94063920
116	RING TYPE CT's		Drawing Number
117	Supply and fit new CT's as per the materials list	Drawing Number	Drawing Number
118	Overhaul CT's (retape as required)	240-94065048	240-94064130
119	Supply and fit CT wiring and lugs		
120	Test CT's	240-65216748	72, To register fro
121	Dry out CT's	240-94065380	240-94063636
122	TAPCHANGER (OLTC)		
123	Overhaul tapchanger	240-94065072	240-94063690

Item	Activity Description	Reference(s)	Document(s)
124	Supply and replace all defective tapchanger parts	240-94065176	240-94063690
125	Test tapchanger continuity		
126	Fit tapchanger to transformer and carry out speed trace	240-94065176	240-94063690
127	FINAL TANKING	240-94065180	
128	Final tank active part	240-94065180	240-94064264
129	Test IR megger core to earth	240-65216748	H-919
130	Fit parts (bushings, tapchanger, ancillary parts and connect ring type CT'	240-94065180	240-94064264
131	TEST TRANSFORMER AFTER FINAL TANKING	240-65216748	917, 240-9406427
132	Test ratio	240-65216748	917, 240-9406427
133	Test polarity	240-65216748	917, 240-9406427
134	Test magnetization	240-65216748	H-919, H-917
135	Test impedance	240-65216748	H-919, H917,
136	Test resistance	240-65216748	876, 240-9406406
137	Test tapchanger continuity		
138	Test IR megger core to earth; core to ground (tank); core to core clamps		
139	OIL FILLING		
140	Supply oil virgin uninhibited	240-119806360	cate supplied by C
141	Polish oil to Eskom specification	240-94065342	cate supplied by C
142	Take oil sample and test for quality, kV and moisture before filling transf	240-94065342	cate supplied by C
143	Draw vacuum for 24 hrs after final tanking active part	240-136487568	1064306 240-940
144	Fill transformer with oil under vacuum	240-136487568	cate supplied by C
145	Circulate oil for 24 hrs	240-136487568	240-129636011
146	Allow 24 hrs standing time after oil circulation	240-136487568	240-129636011
147	Take oil sample and test do dissolved gas analysis (DGA); kV and Moistur	240-94065382	240-94063910
148	TEST TRANSFORMER AFTER OIL FILLING AND CIRCULATION	240-65216748	EC-ST-H-07
149	Test IR megger core to earth; core to ground (tank); core to core clamps		
150	TEST FINAL HV	155832506, IEC 600	240-94064260, H-91
151	Test transformer tan-delta	240-65216748	240-94063602
152	Test lightning impulse @ 100%	155832506, IEC 600	To register
153	Test separate source	155832506, IEC 600	H-919
154	Test induced overvoltage	155832506, IEC 600	240-94064260, H91
155	Test no load loss	155832506, IEC 600	H-919
156	Test full load loss	155832506, IEC 600	H-919
157	Test SFRA	240-65216748	EE-F002
158	Test IR megger core to earth; core to ground (tank); core to core clamps		
159	Take oil sample and test do dissolved gas analysis (DGA); kV and Moistur	240-94065382	240-94063910
160	PREPARE FOR DISPATCH	240-94065316	
161	Drain oil partially	240-136487568	
162	Remove HV Bushings (Blank off)		
163	Fit and connect breather for temporary transport/storage		
164	Fit impact recorder to transformer	240-94065180	240-94064264

Item	Activity Description	Reference(s)	Document(s)
165	Final inspection before dispatch	240-94065180	
166	Test IR megger core to earth before/after loading	240-65216748	H-919
167	Load transformer and parts for transportation to site	240-94065382	