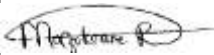





PROJECT NUMBER	2.KRPJ	MANUFACTURER	BBT
STATION NAME	Kriel PS	TYPE	Transformer
PROJECT MANAGER	Madira Mokoena	RATING (MVA)	5
ENGINEERING	Rothi Mafokoane	RATIO (kV)	11/0.4
CUSTOMER	GX Kriel	SERIAL NUMBER	89031
DATE ARRIVED	2023/06/29	SCOPE OF WORK	Redesign, Repair and Rewind

ACTION	DESIGNATION	NAME	SIGNATURE	DATE
COMPILED BY:	Technician Investigation Engin	Rothi Mafokoane		2024/07/02
REVIEWED BY:	Senior Engineer	David Hayes		2024/07/04
ACCEPTED BY:	Project Manager	Madira Mokoena		05/07/2024
APPROVED BY CUSTOMER:	Senior Technologist Engineering	Raonetene Mahlaku		2024/07/07

REMARKS / COMMENTS
The client will advise on which test they would like to be conducted in this unit.

		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 5		
Item	Activity Description			Reference(s)		Document(s)		
1	WINDINGS MANUFACTURE							
2	Redesign windings and compile winding specifications							
3	Manufacture 3 new HV windings as per winding specifications			240-94064354		240-94063680		
4	Manufacture 3 new LV windings as per winding specifications			240-94064354		240-94063680		
5	Manufacture associated winding insulation as per winding specifications			240-94064354		240-94063680		
6	Place windings under hydraulic press and apply compacting pressure			240-94064354		240-94063675		
7	Test continuity and parallel path on every winding			240-94064354		240-94063680		
8	Dry out windings until < 0.8 % water is achieved			240-94064354		240-94063680		
9	Place windings under hydraulic press and apply compacting pressure			240-94064354		240-94063675		
10	Apply assembly pressure and make adjustments as per winding specifica			240-94064354		240-94063675		
11	Test continuity and parallel path on every winding			240-94064354		240-94063680		
12	Conduct final inspection and deliver windings to the assembly section			240-94064354		240-94063680		
13	ASSEMBLE ACTIVE PART							
14	Lay core flat			240-102722919		240-94064262		
15	Supply and fit new core insulation			240-101507295		240-94064270		
16	Supply and fit new limb straps			240-94065382		240-94064264		
17	Clean core and test insulation resistance							
18	Apply varnish to the core laminations							
19	Supply and fit new blocking, press frames and insulation			240-102722919		94064262 200T/6		
20	Fit bottom blocking and support structures referring to drawings			240-102722919		240-94064262		
21	Fit windings to core referring to drawings			240-102722919		240-94064262		
22	Fit top blocking and press rings referring to drawings			240-102722919		240-94064262		
23	Fit top core clamps			240-102722919		240-94064262		
24	Pre-dry active part in vapour phase until < 0.5 % dryness is reached			240-94065380		cate supplied by C		
25	Retension windings as required for core stacking			240-102722919		94064262 200T/6		
26	Pack 1/3 of the top yoke			240-101507295		94064262 200T/6		
27	TEST ACTIVE PART AFTER PACKING 1/3 YOKE			240-65216748		917, 240-9406427		
28	Test ratio			240-65216748		917, 240-9406427		
29	Test magnetization			240-65216748		H-919, H-917		
30	Test IR megger core insulation			240-65216748		H-919,		
31	Complete packing of top core			240-102722919		240-94064262		
32	Supply and fit new leads and harnesses HV			240-101507295		240-94064271		
33	Supply and fit new leads and harnesses LV			240-101507295		94064262 200T/6		
34	Supply and fit new tapping leads and hanesses			240-101507295		240-94064272		
35	Fit harnessing and make temporary connections			240-102722919		240-94064262		
36	TEST ACTIVE PART AFTER PACKING FULL YOKE			240-65216748		917, 240-9406427		
37	Test ratio			240-65216748		917, 240-9406427		
38	Test polarity			240-65216748		917, 240-9406427		
39	Test magnetization			240-65216748		H-919, H-917		
40	Test impedance			240-65216748		H-919, H917,		
41	Test IR megger core to earth			240-65216748		H-919		

Item	Activity Description	Reference(s)	Document(s)
42	Pre-fit tapchanger	240-94065316	
43	Make and tape final connections	240-102722919	240-94064262
44	Apply torque settings on connections		
45	TEST PERMANENT HARNASS CONNECTIONS	240-65216748	917, 240-9406427
46	Test ratio	240-65216748	917, 240-9406427
47	Test polarity	240-65216748	917, 240-9406427
48	Test resistance	240-65216748	876, 240-9406406
49	Test magnetization	240-65216748	H-919, H-917
50	Test impedance	240-65216748	H-919, H917,
51	Test IR megger core insulation	240-65216748	H-919,
52	Pre-fit fixed tap bridge conductors		
53	Test ratio	240-65216748	917, 240-9406427
54	Test resistance	240-65216748	876, 240-9406406
55	Pre-tank active part	240-94065316	
56	Pre-fit bushings	240-94065316	
57	Untank active part		
58	Remove tapchanger	240-94065316	240-94064264
59	Final dry active part in vapour phase until < 0.5 % dryness is reached	240-94065380	cate supplied by C
60	Final jack and tighten all parts	240-94065180	
61	Test IR megger core insulation; core to core clamps; windings to core; wi		
62	Refit tapchanger	240-94065072	240-94063690
63	Apply torque settings on connections		
64	Test ratio	240-65216748	917, 240-9406427
65	Test resistance	240-65216748	876, 240-9406406
66	Final fit tap bridge connectors		
67	Test ratio	240-65216748	917, 240-9406427
68	Test resistance	240-65216748	876, 240-9406406
69	Place active part in a pot over night	240-94065316	
70	BOILERSHOP WORK		
71	Manufacture blanking plates as required	240-94065612	Notes on Drawing
72	Modify top cover to accommodate new earthing insulator		
73	REFURBUSH TANK AND PARTS		
74	Clean, inspect and regasket tank	240-94065180	240-94064264
75	Clean, flush and leak test conservator tank	240-94065382	240-94064264
76	Supply and fit new oil level indicator on conservator (main)		
77	Supply and fit new breathers	240-94065180	240-94064264
78	Supply and fit new Buchholz isolation valves	240-94065382	240-94064264
79	Clean, inspect, flush and seal all pipe work, headers etc.	240-94065382	240-94064264
80	Supply and fit new valves on piping	240-94065382	240-94064264
81	Supply and fit new BMT drain valve	240-94065180	240-94064264
82	Clean, flush and leak test radiators	240-94065380	1064102 240/940

Item	Activity Description	Reference(s)	Document(s)
83	Supply and fit new bleeding plugs		
84	Supply and fit new Buchholz relay	240-94065382	240-94064264
85	Supply and fit new Buchholz oil sampling valve	240-94065382	240-94064264
86	Supply and fit new copper tubing for oil sampling	240-94065382	
87	Supply and fit new pressure relief devices	240-94065382	240-94064264
88	Supply and fit new marshalling kiosk complete with WTI's and OTI and m	240-94065382	240-94064264
89	Supply and fit new cables	240-94065382	240-94064264
90	Supply and fit new bolts and nuts where required	240-94065180	240-94064264
91	PAINTING OF TRANSFORMER AND PARTS	240-99526023	
92	Seal all parts as required before cleaning	240-99526023	
93	Sandblast tank	240-99526023	
94	Tilt tank to enable painting the base underneath	240-99526023	240-94065316
95	Clean and abrade surfaces prior to painting	240-99526023	
96	Apply coatings to transformer and parts as per client specification	240-99526023	
97	Test paint thicknesses	240-99526023	
98	Bring tank to upright position again	240-99526023	
99	Apply coatings to transformer and parts as per client specification	240-99526023	
100	Test paint thicknesses	240-99526023	
101	Remove all protection applied (masking tape,etc)	240-99526023	
102	INSULATORS	240-119807551	240-94063920
103	Check and inspect insulators	240-119807551	240-94063920
104	Clean all insulator shells	240-119807551	240-94063920
105	Supply and fit new insulator seals and gaskets	Drawing Number	Drawing Number
106	Assemble insulator	240-119807551	240-94063920
107	Supply and fit new core earthing insulator	240-94065382	240-94064264
108	OFF LOAD TAPCHANGER		
109	Supply and fit new tapchanger according to engineering specification	240-94065072	240-94063690
110	Check tapchanger for correct operation	240-94065072	240-94063690
111	Dry out tapchanger	240-94065380	cate supplied by C
112	FINAL TANKING	240-94065180	
113	Final tank active part	240-94065180	240-94064264
114	Test IR megger core to earth	240-65216748	H-919
115	Fit parts (bushings, tapchanger, ancillary parts and connect ring type CT'	240-94065180	240-94064264
116	Apply torque settings on connections		
117	Bolt main cover	240-94065180	240-94064264
118	TEST TRANSFORMER AFTER FINAL TANKING	240-65216748	917, 240-9406427
119	Test ratio	240-65216748	917, 240-9406427
120	Test polarity	240-65216748	917, 240-9406427
121	Test magnetization	240-65216748	H-919, H-917
122	Test impedance	240-65216748	H-919, H917,
123	Test resistance	240-65216748	876, 240-9406406

Item	Activity Description	Reference(s)	Document(s)
124	Test IR megger core insulation; core to core clamps; windings to core; wi		
125	OIL FILLING		
126	Supply oil virgin uninhibited	240-119806360	cate supplied by C
127	Polish oil to Eskom specification	240-94065342	cate supplied by C
128	Take oil sample and test for quality, kV and moisture before filling transf	240-94065342	cate supplied by C
129	Fill transformer with oil under vacuum	240-136487568	cate supplied by C
130	Circulate oil for 12 hrs	240-136487568	240-129636011
131	Allow 12 hrs standing time after oil circulation	240-136487568	240-129636011
132	Take oil sample and test do dissolved gas analysis (DGA); kV and Moistur	240-94065382	240-94063910
133	Take oil sample and test for kV and moisture	240-94065382	240-94063910
134	TEST TRANSFORMER AFTER OIL FILLING AND CIRCULATION	240-65216748	EC-ST-H-07
135	Test IR megger core insulation; core to core clamps; windings to core; wi		
136	TEST FINAL HV	155832506, IEC 600	240-94064260, H-91
137	Test transformer tan-delta	240-65216748	240-94063602
138	Test separate source	155832506, IEC 600	H-919
139	Test induced overvoltage	155832506, IEC 600	240-94064260, H91
140	Test no load loss	155832506, IEC 600	H-919
141	Test full load loss	155832506, IEC 600	H-919
142	Test SFRA	240-65216748	EE-F002
143	Test IR megger core insulation	240-65216748	H-919,
144	Take oil sample and test do dissolved gas analysis (DGA); kV and Moistur	240-94065382	240-94063910
145	PREPARE FOR DISPATCH	240-94065316	
146	Fit and connect breather for temporary transport/storage		
147	Fit impact recorder to transformer	240-94065180	240-94064264
148	Final inspection before dispatch	240-94065180	
149	Test IR megger core to earth before/after loading	240-65216748	H-919
150	Load transformer and parts for transportation to site	240-94065382	