PUB-NP-064 Attachment F Supply Issues and Power Outages on the Island Interconnected System

Forms



Revised: 2005-02-02

MSF001 Form No. 334b

Maintenance Standard Report Form NAMEPLATE AND DESCRIPTION

Equipment Type:		ID Number:
Substation/Location:	Manufacturer:	Serial Number:
Date:	Completed By:	
(YYYY-MM-DD)		



Impedance Test Performed (Y/N)

Results Downloaded to ProActiv?

MSF003 Form No. 8b

Rack

Maintenance Standard Report Form **BATTERIES**

Location/Substation:	Manufacturer:	Work Order Number:	ID Number:

Complete the following information. Note deficiencies and corrections in Remarks.							
			Check if Okay (3)				
Number of Cells		Room Ventilated (Y/N)	Free of Corrosion				
Pilot Cell ID		Ventilation Type (Ther., Manual, Timer)	Terminals				
Pilot Cell Temperature	°C	Exhaust Fan Operational (Y/N)	Accessories				
Charger Float Voltage	V	Cells Cleaned (Y/N)	Separators				
Charger Float Current	A	Liquid Level OK (Y/N)	Plates				
Charger Equalize Voltage	V	De-Ionized Water Added (Y/N)	Casing (Jar)				

Regular Equalizing Carried Out (Y/N)

If an impedance test was performed, attach a copy of the results printout. Cell voltage need not be recorded in this case.

Cell No.	Volts	Specific Gravity									
1			16		3-11.1-15 <u></u>	31			46		9=11.1-13
2			17			32			47		
3			18			33			48		
4			19			34			49		
5			20			35			50		
6			21			36			51		
7			22			37			52		
8			23			38			53		
9			24			39			54		
10			25			40			55		
11			26			41			56		
12			27			42			57		
13			28			43			58		
14			29			44			59		
15			30			45			60		

Remarks:			
		(attach copie	es of MSF018 for additional comments as required)
Type of Maintenance:	Date:	(YYYY-MM-DD)	Inspected By:



Maintenance Standard Report Form **BATTERY CHARGERS**

MSF004 Form No. 102

Revised: 2008-04-03

Substation/Location:	Work Order Number	er:	ID Number:	
Manufacturer:			Serial Number	:
Complete the following. Note deficiencies as	nd corrections in Rem	arks.		
Type or Style/Model		Equalize Voltage	<u>.</u>	Volts
AC Supply Voltage (in cabinet)	Volts	DC Voltage Posi	tive-Ground	Volts
AC Panel Breaker Rating Float Voltage	Amps	DC Voltage Neg Current Limit Se		Volts
Float Current	Volts Amps	Current Linnt Se	tung _	Amps
Mark the appropriate block with an X		Voc	No	
Copy of Charger Manual On-Site		Yes	No	
Breakers, Contactors, Switches and Relays F	Sunctioning Properly			
Alarms Operational	unctioning reoperty			
Dust Cleaned From Rectifier				
Ground Leakage on DC Bus				
Wiring Connections Tight				
Component Mounting Bolts Tight				
Excessive Heat or Noise				
Charger Securely Mounted				
Charger Functioning Properly				
Ground Test Performed				
Remarks:				
	(attac	h copies of MS	F018 for additional	comments as required)
Type of Maintenance: Date:		Inspec	ted Bv:	
Type of Maintenance: Date:	(YYYY-MM-DD)		V -	



Revised: 2012-07-30

MSF005 Form No. 227

Maintenance Standard Report Form

CIRCUIT BREAKERS

Substation/Location:	Work Order Number:		ID Number:	
Manufacturer:	Serial Number:	Type:		Rated Voltage:

Check each item with a $\sqrt{}$ for OK, X to indicate a problem, N/A for not applicable, or N/D for not done. All entries must be completed during a Maintenance IV, unless otherwise indicated. Initial each entry. Once work is done, the Maintenanceman and the Maintenance Supervisor must sign it off.

#	Type of	f Maint.	Task			Status or	Initial
	I	III				Results	IIIItitai
			General			, , , , , , , , , , , , , , , , , , ,	
1,2,3	X	X	Appropriate Documentation Reviewed				
6	X		ID Number Installed (N/A for Maintenance IV)				
7	X	X	Nameplate Information Recorded				
8	X	X	Counter: Start Value				
			Finish Value				
9	X	X	External Visual Inspection				
10	X	X	Check for Presence of Abnormal Noise or Heat				
11	X	X	Leveled, Grounded and Anchored				
12		X	CT Operation Verified Via Ammeters				
13		X	Painting Done as Required				
			Oil Filled Units Only			, , , , , , , , , , , , , , , , , , ,	
14	X	X	PCB Level Checked; Recorded (PPM)				
15	X	X	Check Oil Level/Leaks				
16	X	X	Check Breather				
17	X	X	Oil Dielectric				
			SF6 Units Only				
18	X	X	Gas Pressure/Density Check (psi)		Phase 1:		
					Phase 2:		
				Phase 3:			
				Γemp. (°C):			
10	**	**	General				
19	X	X	Heaters Operational				
20	X	X	Operating Mechanism Cleaned and Lubricated				
21	X	X	External Mechanism Check				
22	X	X	Breaker Operated Locally and Remotely	0.~		3.60	
23	X	X	Megger Test Results	°C	kV	ΜΩ	
			Phase to Phase:				
			Phase to Ground:				
			Across Open Contacts:				
2.1	***	**				- ·	
24	X	X	Ductor Test Results (micro-ohms)		Across	Bushing-	
				Phase 1:	Contacts	Bushing	
				Phase 1: Phase 2:			
				Phase 2:			
25	X	X		pening Velo			
				Closing Velo			
				Contact	t Wipe (In.)		
					Ctualra (T.:)		
			Car	ntact Part Ti	Stroke (In.)		
			Col	maci Part 11	me (cycles)		

MSF005 W.O. Number: Type of Maint. # Status or **Task** Initial **Results** Reclose Time (cycles) Trip Free Time (cycles) Overtravel (cycles) Visual Check of Bushings and Bushing Gaskets 26 X X 27 Power Factor Test No. 1: No. 4: No. 2: No. 5: No. 3: No. 6: 28 CT Ratio Test (N/A for Maintenance IV) X 29 X CT Polarity Test (N/A for Maintenance IV) Megger Results: Secondary Winding $^{\circ}C$ kV $M\Omega$ **Bulk Oil and Minimum Oil Units Only** Oil Filtered 32 Oil Removed for Inspection Tank/Interrupter Chamber Opened for Inspection 33 34 Internal Components Cleaned and Tank Flushed 35 **Internal Visual Inspection** 36 Energy Absorbing Components Sound and Secure Tank Liners Inspected 37 38 Moving Contacts Inspected Interrupter and Grading Resistor Examined/Cleaned 39 40 Contact Synchronization Checked 41 Internal Operating Mechanism Check Internal CTs Inspected 42 43 Oil Level Indicators 44 Gaskets and Seals Inspected 45 Conduits and Wiring Okay Internal Heaters and Thermostats Checked 46 X 48 Interrupting Chamber Refilled with Oil 49 Oil Dielectric (kV) **Metal Clad Units Only Box Barriers Okay** 50 X X 51 X X **Insulating Parts Clean** 52 Primary Contacts Inspected 53 X Primary Contact Wipe 54 X Primary Contact Gap 55 Arcing Contacts Okay 56 Arcing Contact Wipe Arc Chutes Inspected and Cleaned 57 58 X Blow Out Devices Inspected X **Interlocks Operating Properly** 59 X 60 X Mechanism Cleaned and Lubricated Operating Mechanism Wipes, Clearances and Gaps 61 X Lifting Mechanism and Limit Switches Okay 62 X X Breaker Checked in 'test' and 'operate' Positions 63 **SF6 Units Only** 64 Interrupters Opened Poles Refilled With Sf6 Gas 65 Check for SF6 Leaks using Sniffer and/or Leak Check 66 Pole Unit Heaters Inspected 67 X 68 X **External Capacitors Checked Units With Air Compressors Only** 69 X X Pneumatic Mechanism Checked 70 Connections Tight X X Pneumatic Mechanism Wiring Inspected 71 X X 72 Condensation Drained From Compressor Tank 73 X X Compressor Oil Level Checked

			W.O. Number:				MSF005
#	Type o	f Maint. III	Task			Status or Results	Initial
74		X	Compressor Oil Changed				
75		X	Air Filter Cleaned				
76	X	X	Safety Valves and Pressure Switches Operational				
77	X	X	Condition and Tightness of Belts				
78	X	X	Inflation Time Checked		essure (psi): Time (sec):		
79		X	Operation Rundown (N/A for Maint. IV) Operations bef				
			Operations at	fter low-pres	ssure cutoff:		
80	X	X	Motor Load Current (A)				
81	X	X	Rate of Air Leakage Okay				
82		X	Minimum Pneumatic Mechanism Voltages (N/A for Maint. IV)		Trip: Close:		
83		X	Pneumatic Mechanism Dimensional Checks				
84	X	X	Pressure Vessel Permit Expiry Date (yyyy-mm-dd)				
85		X	Tank Repaired				
			ASEA Minimum Oil Units Only				
86			Burning of Plug Contact Checked				
87	X		Extinguishing Chamber and Fixed Contact Checked				
88			Gas Discharge Valves Checked				
89	X		Breaker Dismantled, Cleaned and Inspected				
90	X		Breaker Trips on Trip Coils Checked				
	1	1	General		1		T
91			Final Megger Test Results	°C	kV	ΜΩ	
			Phase to Phase:				
			Phase to Ground:				
0.2			Across Open Contacts:		D1 1		
92			Final Ductor Test Results (micro-ohms)		Phase1:		
					Phase 2:		
02			F' - 1 Mar' - a A - 1 - a Track D - 1 to		Phase 3:		
93				pening Velo			
				Closing Velo	t Wipe (In.)		
				Contac	t wipe (iii.)		
					Stroke (In.)		
			Co.	ntact Part Ti			
				Reclose Ti	me (cycles)		
				Trip Free Ti			
				Overtra	vel (cycles)		
94			Operating Mechanism Checks				
95	X		Bushing Connectors Tight				
96		X	Oil Sample Taken (Bulk Oil Units Only)				
97	X	X	Avantis Updated				
98	X	X	Documentation Distributed				
99	X	X	Deficiencies Flagged in Avantis				
Remar	<u>ks</u> :						
·			(attach copies of M	<u> 1SF018 as</u>	required for	or further i	remarks)
Type of	f Mainte	nance:	Date: Inspected By:				



Revised: 2007-10-01

MSF006 Form No. 167a

Maintenance Standard Report Form

RECLOSERS

Substation/Location:	Work Order No.:	Manufacturer:	Control:	ID Number:

Section 1: Check each item with a $\sqrt{}$ for OK, X to indicate a problem, N/A for not applicable, or N/D for not done. All entries must be completed during a Maintenance IV, unless otherwise indicated. Initial each entry. Once work is done, the Maintenanceman and the Maintenance Supervisor must sign it off

			pervisor must sign it off.		
#		f Maint.	Task	Status or	Initial
1 2 2	I X	X	Maintananaa Historia Chandanda and Manufastanan'a Information Davissa d	Results	
1,2,3	X	X	Maintenance History, Standards and Manufacturer's Information Reviewed ID Number Installed		
6 7	X				
	X	X	Nameplate Information Recorded Counter: Start Value		
8	Λ	Λ	Finish Value		
9	V	V			
10	X	X	External Visual Inspection		
			Check Presence of PCB; Record Level (PPM) Lab Sample Taken: Yes No		
11	X	X	Leveled, Grounded and Anchored (N/A for Maintenance IV)		
12	X	X	Check Oil Levels and Leaks		
13	X	X	Oil Dielectric (kV)		
14	X	X	Bushings and External CTs		
15	X	X	External Mechanism Checks		
16	X*		Meggered Unit		
17	X*		Ductored Unit		
18	X*		CT Ratio Tests		
19	X*		CT Polarity Test		
20	X*		Functional Checks Performed		
21	X*		Tank Lowered for Inspection		
22			Oil Filtered or Removed		
23	W.T.I.		Tank and Components Cleaned		
24	X*		Internal Visual Inspection		
25	X*		Liners and Foam Pads		
26			Tank Repaired as Required		
27			Moving Contacts Inspected		
28			Interrupters and Contacts Disassembled, Inspected and Repaired		
29			Bushings Disassembled and Repaired and Gaskets Replaced		
30			Hydraulic Control Units Cleaned		
31	X*		Closing Coil: Resistance (Ohms)		
			Voltage (kV)		
32	X*		Closing Contacts: Inspected		
			Fuse Rating Checked		
33	X*		Trip Coil: Inspected		
			Coil Size		
34			Mechanism Dropped and Checked		
35	X*		Hydraulic Fluid Levels		
36	X*		Single Operation to Lockout on "F"		
37	X*		Hydraulic Settings and Ratings Match Nameplates		
38	X		Visual of Components on Head, Frame and Mechanism		
39			Electrical Check of Components on Head, Frame and Mechanism		
40	X*		Operating Levers and Counter		
41			Internal Mechanism Checks		
42		X	Head and Auxiliary Gaskets		
43	X*		Final Ductor Test Results (micro-ohms): Across Contacts	Bushing- Bushing	
			Phase 1		
			Phase 2		
			Phase 3		

#		Maint.	Task			Status or	Initial
	I	Ш				Results	
44	X*		Tank Lip Painted and Bolts Sealed or Lubricated as Required				
45			Oil Filled to Correct Level				
46			Re-Check Oil Dielectric (kV)				
18	X	X	Manually Operated to Expel Air				
19			Control Cable Electrical Check				-
0	X	X	Control Cable and Connector				-
51	X	X	Devices and Cards Secure				-
52		X	Control Accessories				-
3	X	X	Quick Battery Check (N/A for Maintenance IV)				
54			Battery Discharge Test				
55	X*	X	Terminations Clean and Tight				ļ
66	X	X	Position Indicator and Lights				ļ
57	X	X	Auxiliary Switches and Relays				
58	X	X	Charging Motor Brushes, Commutator and Mounting				
59	X	X	Charging Motor Current (A)				
60	X	X	Capacitive Trip Devices				
i1	X	X	Reclose Block Switch Reset				
52	X	X	Ammeter Sockets and Wiring				
3a	X*	X	CTs, Relays and Ammeters Numbered; Meter Operation Checker	d; Multipl	ier Labeled		
3b	X*	X	CT Ratio				
54	X*	X	Cabinet Heaters				
55	X	X	Ground Trip Switch				
66	X	X	Final Megger Test Results:	°C	kV	ΜΩ	
			3Ф - Ground				
			$2\Phi - 1\&3\Phi$				
			1Ф Cont.				
			2Ф Cont.				
			3Ф Cont.				
7	X	X	Functional Check				
8	X	X	Control Settings Recorded				
9	X		Recloser at Correct Height				
0	X	X	Painting				
1	X	X	PCB Sticker Installed				
2	X	X	Risers, Disconnects and Switches (N/A for Maintenance IV)				
3	X	X	Documentation Distributed				
4	X	X	Maintenance Record Updated in Avantis				
5	X	X	Deficiencies Flagged in Avantis				
eani	red for new	installatio	n only				

Maint. Type:	Date	(YYYY-MM-DD)		Supervisor _	
			(at	tach copies of MSF018 for additional c	comments as required)
Enter Details of Fa	ults Found an	d Corrective Actions	:		
		Time Delay			
Ground Trip Mecha				ecked Settings on all Relays	_
		2		ercurrent Relay Instantaneous: Phase _	
		(ydraulic)		ercurrent Relay Time Dial: Phase	
		Second Thir		ercurrent Relay Tap Block: Phase	
F	Reclosing Interv	al Delays:	Gro	ound Trip Solenoid (Hydraulic): Series	Parallel
7	Гime Delay Cui	rve (Hydraulic)		nimum Trip Resistor (Electronic): Phas	
I	Fast Operations			set Delay Interval: seconds	
	Operations to L	ockout	Pha	se Trip Plugs (Electronic): 1 st	_ 2 nd



MSF007 Form No. 357

Revised: 2005-02-16

Maintenance Standard Report Form AIR-BREAK, FUSE AND DISCONNECT SWITCHES

Substation/Location:	Work Order Number:	ID Num	iber:		
Manufacturer:	Serial Number:	Rated A	amps:	Rated Volts:	
Check blocks to indicate type of switch: Group Operated Hook Stick Operated Motor Operated Grounding Switch Mark the appropriate block with an X: Adjustments Made (Give Details in Remar Structure Solid and True Silicone Grease Used on Insulators Conducto-lube Applied to Contacts	High-Speed Ground Swite Vertical Break Side Break Center Break	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	Vertical Base I Horizontal Base Inverted Base Power Fuses Theck: Slade and Jaw Contalignment Arcing Horns Insulators	se Mounting Mounting acts	
Lubricant Applied Where Required Hook Stick Operated: Latching Mechanism Grounding Switches: Mechanical Interlock Motor Operated: Control Fuses and/or Circ of Proper Rating High-Speed Ground Switches: Protection S Operated to Close Switch Switch Base and Handle Properly Grounde Gradient Control Mat Properly Installed All Nuts, Bolts and Pins in Place and Tight Control Cabinet (where applicable) Clean, Power Fuse Blown Signs of Carbon or Tracking Normal In-Service Blade Position: Open	n Operational	To G Sy M	tatic Strip on Polye Bearings (where ferminal Connection fround Connections witch Mechanism a flotor Operated Swi Manual and Elec Control Wiring C Limit and Auxili Motor Cutout Sw Contactors Heater Lubrication ligh Speed Ground Jaw Insulator Co Heater in Trip C	applicable) ns s and Hardware itches: etrical Operation Connections ary Switches vitch Switches: olumn	
Work Done With Switch: Completely De- <u>Remarks:</u>	energized Partially D	e-energized			
Type of Maintenance Date	(YYYY-MM-DD)	ected By			_



MSF008 Form No. 231a

Maintenance Standard Report Form

Substation/Location:		Work Orde	r Number:	ID Number:	
Manufacturer:	Serial Num	ber:	Type:	Rated Amps:	Rated Volts:
Notes: - A separate form show - This form does not in				enance is reported on MS	F005.
heck:			Mark the appr	opriate block with an X:	
Bus Bars Bus Supports Barriers Arc Chutes Insulators Cables and Terminations Potheads PT Carriage Heaters, Thermostats and Ven Control Switches Paint Megger Test: Phase to Phase Phase to Ground	ats		Air Filters Cle Bus Insulated All Nuts and I Cubicle Cover Door Operatir Breaker Move Ground Bus C Mechanism L All Relays and Control Wirin Safety Interloc CT Checks:	Bolts Tight rs in Place rg Properly rs In and Out Freely ronnections Tight abricated d Meters Operating g Connections Tight rcks Operational Ratio Continuity Ground Polarity rs Watertight	Yes
			Levering or L Control and R		vising

Inspected By:



MSF009 Form No. 353

Revised: 2010-10-27

Maintenance Standard Report Form **POWER TRANSFORMERS**

Substation/Location:	Work Order Num	ber:	ID Number:		
Manufacturer:	Serial Number:	Rated Voltage (kV):	KVA:		
Complete the following:	<u> </u>	Mark the appropriate block with a	n X:	V	NI.
Dew Point (if required):°C Oil Dielectric:kV PCB Level PPM Megger Test (in oil): Core – Ground Two-Winding Transformers a) H – L&G at b) L – H&G at c) H&L – G at Three-Winding Transformers a) H – LT&G at b) L – HT&G at c) T – HL&G at c) T – HL&G at d) H&L – T&G at e) H&T – L&G at g) HL&T – G at Weather Conditions and Temperature a	VVVVVVVV tt Time of	Tank Opened Humidity Absorbent Packet Installed Core Exposed to Atmosphere Spill Pan Free of Oil Vacuum Pulled Oil Sample Obtained for Gas Analyse Tank Ground Connections Tight Evidence of Oil Leakage Lubricant Applied to Off-Load Tapch All Nuts and Bolts Tight All Gauges in Good Physical Condition Fan Motor Drains Open Fan and Exerciser Operating Properly Conduits Properly Fastened Control Wiring in Good Condition Transformer Protection Devices Inspectation All Junction Boxes Inspected Oil Added	es nanger Handle on	Yes	<u>No</u>
If Tank was Open to Atmosphere: Time Duration Open Weather Conditions While Open		Pressure Relief Device on Transforme If So, Operation Indicator and Alarm Internal Inspection of Transformer M If So, Complete Remainder of This Se Loose or Damaged Parts Tools or Debris Found	Switch Required Resetting ade ction		
Voltage Connection Megger Test Control Wiring For: Oil Level Gauge Oil Temperature Gauge Winding Temperature Gauge Gas Detector Relay Pressure Relief Device	at 250V at 250V at 250V at 250V	Explosion Vent Lower Diaphragm In Main Tank Oil-Level Gauge Checked Spray Nozzles Installed Bushing Leads in Good Condition CT Leads and Control Wiring Good a Tapchanger Leads Good and Connect All Nuts and Bolts in Place and Tight Core Laminations and Supports in Place	and in Place ions Tight		
Oil TemperatureOil Temperature Alarm SettingOil Temperature Trip Setting Temperature Gauge Setting to Start Fano°C _ 2 nd Stage Winding Temperature Winding Temperature Alarm Setting Winding Temperature Trip Setting Oil Level Gauge Reading	"C "C "C "C "C "C	Off-Load Tapchanger in Good Condition Terminal Board structure Good Any Sign of Carbon or Tracking Shipping Braces (if any) Removed CTs, PTs and Auxiliary Transformers Coils and Insulation in Good Condition Bottom of Tank Free From Debris or Any Sign of Moisture Cracks in Tank Wall, Especially in W	Properly Mounted on Loose Parts		

Damage Marks o	on Tank Wall		Lin <u>ks</u>	Checked for Prope	r Connections and	d Tightness	MSF009
Physical Condition Paint Bushings Lightning Arresto Bushing Oil Leve	ers	Line Cor Alarms (Gaskets	neck if Okay: nnections Operational Wiring Terminal Cabinet	Connections	Silica Ge	el	
Ratio Test:	H1 Phase	H2 Phase	H3 Phase	<u> </u>	H1 Phase	H2 Phase	H3 Phase
	H1	H2	H3		H1	H2	H3
Ton Docition				Ton Position			
Tap Position				Tap Position 18			
2				19			
3				20			
4				21			
5				22			
6 7				23 24			
8				25			
9				26			
10				27			
11				28			
12 13				29 30			
14				31			
15				32			
16				33			
17 Remarks:				J			

		MSF009



Revised: 2010-01-05

MSF010 Form No. 354

Maintenance Standard Report Form **TAPCHANGERS**

Substation/Location:	Work Order N	Number:		ID Number:
Manufacturer: Ser	rial Number:			Type:
Complete the following:				
Counter Reading:		Oil Level G	auge Re	ading:
Start Finish		Tapchan	ger Com	npartmentkV
Oil Dielectric:		Diverter	(if separ	rate) kV
Tapchanger CompartmentkV		Motor Megg	ger Test	Mega-Ohms
Diverter (if separate)kV		Motor Curre	ent	Amps
PCB Level: PPM				
Mark the appropriate block with an X:				Check:
0 1 1 1/4 11		Yes	<u>No</u>	T 1 C D C
Operated: Manually				Insulating Barriers Arc Chutes
Electrically				
Evidence of Oil Leakage Outside				Contacts
Evidence of Oil Leakage Between Tanks				Gears Cams
Evidence of Moisture in Compartment(s)				
Oil Filtered				Chain Drive (where applicable) Mechanical Stops
Oil Replaced				Brake Operation
Compartment(s) Flushed With Clean Oil				Operations Counter
Gears, Shafts, Bearings, etc., Lubricated				Gaskets
All Control Features Operational				Relief Vent and/or Breather
Tap Position Indicator Operational				Oil Filter (if applicable)
Drag Hand Reset Operational				Contactors
Limit Switches Operational				Relay Contacts
All Nuts and Bolts Tight				Auxiliary Switches
All Pins Properly in Position				Cabinet Heaters and Thermostat
Pressure Relief Device on Tapchanger				Cabinet Light and Receptacle
If So, Operation Indicator and/or Alarm Switch Requi	red Resetting			Wiring Connections Tight
Control Cabinet Clean and Dry	rea resetting			
Oil Sample Obtained				
On Sample Obtained				
Remarks:				
Type of Maintenance Date	Inc	spected By		
Type of framewhere Date	IIIS	pected by		



Revised: 2005-09-13

MSF011 Form No. 351b

Maintananca Standard Report Form

	Maintenance	Standard	i Keport r	OHH
P	OTENTIAI	LTRAN	ISFORM	IERS

Substation/Location:	Work Order Number:	ID Number:
Manufacturer:	Serial Number:	Type:

Enter details of faults found and corrective actions in the Remarks section.

Section 1: Check each item with a 3for OK, X to indicate a problem, N/A for not applicable, or N/D for not done. All entries must be completed during Maintenance IV, unless otherwise indicated, Initial each entry. Once work is done, the Maintenanceman and

#	Type of	Maint.				Status	
	I	III	Task			or Results	Initia
1	X		ID Number Installed (N/A for Maintenance IV)				
2	X		Nameplate Information Recorded				
3	X	X*	External Visual Inspection				
4	X	X	PCB Labeled and Tested (PPM)				
5	X	X	Thermo Scan Information Reviewed				
6	X	X*	Oil Indicators and Levels				
7	X	X*	Evidence of Oil Leaks				
8	X	X*	Megger Test Results:	°C	kV	ΜΩ	
			H-Ground: L-Ground: H-Low:				
9	X	X*	Power Factor H–Ground (%)				
10	X		Ratio Tested Okay				
11			Oil Dielectric (kV)				
12			Moisture Sensitive Components Placed In Oil While Out				
13			Internal Cleaning and Inspection				
14			Bushings, Gaskets, etc. Okay				
15			Welding Done As Required				
16			Drying Carried Out				
17			Maximum Time That Moisture Sensitive Components Were Out	of Oil (hrs)			
18	X		Continuity Checks Okay				
19			Final Megger Test:	°C	kV	ΜΩ	
			H-Ground:				
			L-Ground:				
			H-Low:				
20			Final Power Factor Test H-Ground (%)				
21			Final Ratio Test				
22	X	X*	High Voltage Terminals Clean and Tight				
23	X	X	Secondary Junction Box Okay				
24	X	X*	Tank Rust-Free and Painted				
25	X	X*	Ground Terminal Clean and Secure				
26	X	X	Secondary Wiring and Connectors				
27	X	X	Secondary Fuses				
28	X		Back Energized 15 Minutes atkV				
29	X	X	Mounting, Grounding and Risers Okay (N/A for Maintenance IV)			
30	X	X	Secondary Voltages Checked Okay (N/A for Maintenance IV)				
31	X	X	Primary Fuse and Fuse Holder Okay (N/A for Maintenance IV)				
32	X	X	No Abnormal Noises Present (N/A for Maintenance IV)				
34	X	X	Maintenance Entered in Avantis				
35	X	X	Forms Distributed as Required				

<u>on 2</u> : Record pi Secondary	rimary voltage injection Tap Connection	Nameplate Ratio	Voltage Applied	Voltage Measured	Ratio
Winding	Tap Connection	Namepiate Katio	H1-H2	voltage Weasured	Katio
•					
X					
Y					
nrks:					
II K5.					

PUB-NP-064, Attachment F Page 17

(YYYY-MM	-DD)	
Maint. Type: Date:	Maintenanceman:	Supervisor:
	(attach copies	of MSF018 as Required for Further Remarks)
		MSF011



MSF012 Form No. 230b

Maintenance Standard Report Form S

	Maintenance Standard Report Port
evised: 2005-09-13	VOLTAGE REGULATORS

Substation/Location:	Work Order No.:	Control:		ID Number:
Amps:	Volts:		Manufacturer:	

Check each item with $\sqrt{}$ for OK, X to indicate a problem, N/A for not applicable, or N/D for not done. Initial each entry. Maintenance III procedures are indicated in column 2. Maintenance IV requires all steps to be completed, unless indicated otherwise.

#	Maint. I	Maint. III	Task	Status/ Results	Initial
1	X		ID Number Installed (N/A for Maintenance IV)		
2	X		Nameplate Information Recorded		
4	X	X	Counter Reading: Start:		
			Finish:		
5	X	X	Control Panel Settings: Set Point (V):		
			Bandwidth (V):		
			Time Delay (s):		
			Real Compensation (Ohms):		
			Reactive Compensation (Ohms):		
6	X	X	General Condition (N/A for Maintenance IV)		
7		X	Unit Operated Two Steps Up and Down (N/A for Maintenance IV)		
8	X	X	Oil Indicators and Levels		
9			Oil Level Indicators Replaced		
10	X	X	Evidence of Oil Leaks		
11	X		PCB Labeled, Level (ppm)		
12	X	X	Oil Dielectric (kV)		
13	X		Continuity Between Bushings		
14	X		Megger Test: Megger Reading (M Ω):		
			Megger Voltage (Volts):		
1.5	T 7 de		Insulation Temperature (°C):		
15	X*		Regulator Tank Removed		
16	X*		Internal Components Cleaned		
17	X		Internal Inspection		
18	X X		Windings and Control Wiring All Contacts OK		
19	X				
20	X		Nuts and Connections Tight		
22	X		Visual of Contact Operation Drive Mechanism OK		
23	X		Position Indicator Assembly		
24	X	X	Neutral Position Indicators		
25	X	Λ	Surge Bypass Device		
26	X		Bushings and Associated Parts		
27	X		All Gaskets and Seals Tight		
28	X		Time Unit Out of Oil (hrs)		
29	X*		Repeat Megger Test: Megger Reading (M Ω):		
2)	21		Megger Voltage (Volts):		
			Insulation Temperature (°C):		
30	X*		Motor Current (amps)		
31	X		Ratio Test Carried Out (Attach TTR Results)		
32	X		PT Ratio Test Carried Out (Attach TTR Results)		
33	X		CT Ratio Test Carried Out (Attach TTR Results)		
35	X	X	Control Functions Checked		
36	X	X	Position Indicator Functions		

1	١./	S	D/	Λ1	1
	VI		Г١		1 2

#	Maint	Maint.		1	WISI 012
#	Maint.		Task	Status/	Initial
	1	III		Results	
37	X		Spot Painted as Required		
38	X*		Enclosure Rust-Free, Repaired and Repainted. Welding Done as per MS###.		
39	X		Bushings Identified		
40	X	X	Position Indicator Cleaned and Lubricated		
41	X		Ground Terminal Clean and Tight		
42	X	X	Control Cable		
43	X		Unit Left in Neutral		
44	X		PT Tapped ForkV		
45	X		Breather Plugs Installed or Removed as Appropriate		
46		X	Mounting, Grounding and Risers (N/A for Maintenance IV)		
47	X		Disconnects and Bypass (N/A for Maintenance IV)		
48	X		Regulator Tested in Test Bay Date:		
49	X	X	Maintenance Entered in Avantis		
50	X	X	Documentation Distributed		
51	X	X	Deficiencies Flagged in Avantis		

Transformer Ohmmeter Test:

Lower	Resistance (mΩ)	Difference	Raise	Resistance (mΩ)	Difference
1L			8R		
Neutral			9 R		
1R			10R		
2R			11R		
3R			12R		
4R			13R		
5R			14R		
6R			15R		
7R			16R		

PT Internal Tap	PT Control Panel Tap	Nameplate Ratio	Measured PT Ratio	Calculated PT Ratio
Position	Position			
		:1	Volts	:1
		CT Nameplate Ratio	Measured CT Ratio	Calculated Ratio
		_		
		:1	Amps	<u>:</u> 1

		(Attach conies of	MSF018 for additional	acomposite of magnined)
Enter details of faults for	and and corrective actions:			
		 	Amps	: 1



Revised: 2005-09-13

MSF013 Form No. 352

Maintenance Standard Report Form

CURRENT TRANSFORMERS

Substa	tion/Location:	Work Order Number:		ID Number:	ID Number:		
Manuf	acturer:	Serial Number:	Type:	Maximum F	Maximum Rated Amps:		
complet	each item with a 3for OK, ed during Maintenance I or ork is done, the Maintenance	III, unless otherwise indic	cated. These units	never require a Maint			
#		Task			Status or Results	Initial	
1	ID Number Installed (N/A fo	or Maintenance III)					
2	Nameplate Information Reco	orded (N/A for Maintenance	e III)				
3	External Visual Inspection		,				
4	Primary Bushings Cleaned*						
5	Painting as Required*						
6	PCB Level Checked; Label	Installed (PPM)					
7	Unit Properly Grounded, Se						
8	Check Oil Level Gauge (If A						
9	Megger Test Results*	тррпецие)		Primary-C	ND:		
,	Wegger Test Results			Secondary-C			
					atio:		
10	Ratio Continuity Checked*			10	atio.		
10		ķ					
11	Ratio Checked On All Taps						
12	Polarity Checked (N/A for N	/laintenance III)					
13	Secondary Current Checked	27/1 6 27/1					
14	Check for Abnormal Noise (N/A for Maintenance I)					
17	Avantis Updated						
18	Documentation Distributed only if unit is de-energized						
Remark							
			(attach copies	of MSF018 as Requ	ired for Further	Remarks)	
Maint.	Гуре: Date:	Maintenancen	nan:	Supervisor:			



MSF014 Form No. 356

Maintenance Standard Report Form POWER CABLES AND ACCESSORIES

Revised: 2005-02-16 Work Order Number: Line Voltage: **Substation/Location: ID Number: Complete the following:** Single Phase or Three Phase Oil Filled Cables: Reservoir Pressures _____ oC ____ OC Megger Test: Phase to Ground ______Phase to Phase _____ Alarm Settings: High _____ Low ____ Mark the appropriate block with an X: <u>Yes</u> <u>No</u> Trench/Ducts Clean and Free From Defects Any Sign of Arcing or Tracking Cables and Potheads Properly Grounded and/or Insulated Evidence of Oil Leaks Evidence of Compound Leaks Primary Connections Clean and Tight Grounding Connections Complete and Tight Any Sign of Deterioration or Damage Pothead Bushings in Good Condition Cables Adequately Supported **Remarks:** Type of Maintenance: ____ Date: ___ ____ Inspected By:



Revised: 2005-02-16

MSF015 Form No. 362

Maintenance Standard Report Form MISCELLANEOUS EQUIPMENT

Substation/Location: Division: Mark the appropriate blocks with an X to indicate the equipment covered by this report: Yes No No Metering Tank Yard Structure Company Number ___ Station Service Transformer Buswork Foundations AC and DC Distribution Insulators Grounding Other Yard Lighting Control Cables Specify _____ Lightning Arresters Control Building ID Number Mark the appropriate block with an X: **Yard Lighting:** No Fixtures Securely Mounted **Structures:** Yes No All Lights Operating Properly All Nuts and Bolts in Place and Tight Lenses and Enclosures in Good Condition Sufficient Back-Filling Around Footings Structure Solid and True **Foundations:** Paint Condition Good Level Crossarms in Good Condition Any Sign of Breakage or Moving **Station Service Transformer: Buswork:** Ample Phase-to-Phase & Phase-to-GND Clearances Any Sign of Oil Leakage **Bus Securely Supported Bushings in Good Condition** Insulators Good and Clean Paint Condition Good Dissimilar Metals Used Tank Properly Grounded All Nuts and Bolts in Place and Tight Secondary Leads Enter Bushing Terminal Connectors at the Top (if outside) **Insulators:** Oil Dielectric _____kV (if requested) Any Sign of Contamination or Flashover **Grounding:** Any Cracked or Broken Porcelain Any Damaged or Broken Wire All Pins in Place Grounding Done as per Current Practices All Equipment Grounded as Required **Lightning Arresters:** All Connections Tight Securely Mounted Any Broken or Cracked Porcelain **Control Cables:** Line and Ground Connections Tight In Place and Properly Protected Cement in Flanges in Good Condition Connections Tight Any Sign of Corrosion at Terminals **Metering Tank:** Securely Mounted **AC and DC Distribution:** Vent Plug Removed Panels Mounted Securely Primary and Secondary Connections Tight Breakers Installed Correctly Any Sign of Oil Leakage Wiring Connections Tight **Bushings in Good Condition** Cables/Conduits Properly Connected/Supported Paint Condition Good Current Loading Within Panel Rating Tank Properly Grounded Any Sign of Corrosion on Breaker Terminals Any Sign of Overheating Battery Charger and/or Other Such Essential Equipment on Separate Breaker

Mark the appropriate block with an X:		MSF01
Control Building: Paint Condition Good Inside and Outside Doors and Windows Fit Properly Locks Operating Properly Building Free of Water Leaks Lights, Receptacles and Switches Operational Thermostats and Heaters Operational Toilet and/or Wash Basin Operational Ventilators Operational (if existing)	Yard: Fence and Gates in Good Condition and Properly Grounded All Usual Precautions Taken to Prevent Unauthorized Entry (barbed wire on top of fence and no gap under fence) Locks Operating Properly Trenches in Good Condition and Covers in Place Yard Clean and Tidy High Voltage Danger Signs in Place Crushed Stone as per Specifications Adequate Snow Clearing (in winter)	
Remarks:		
Type of Maintenance Date	 Inspected By	



Revised: 2011-05-24

MSF016 Form No. 167b

Maintenance Standard Report Form

NU-LEC RECLOSERS

Substation/Location:	Work Order No.:	Manufacturer:	Control:	ID Number:

Check each item with a $\sqrt{}$ for OK, X to indicate a problem, N/A for not applicable, \rightarrow indicates a value required or N/D for not done. Initial each entry. Once work is done, the Maintenanceman and the Maintenance Supervisor must sign it off. Complete all steps for a Maintenance A, B, III, or Maintenance V, unless otherwise indicated. This unit never requires a Maintenance IV.

Proc.	Task		Status or Results	Initial					
1,2,3	Maintenance History, Standards and Manufacturer's Information Reviewed								
6	ID Number Installed								
7	Nameplate Information Recorded								
8	Counter: Start Value →								
	Finish Value →								
9	Cubicle Louvers and Water Drainage Holes Free; Unit Cleaned								
10	Rubber Door Seal Checked								
11	Install AC Supply Cord								
12	Check Cabinet Receptacle Polarity								
13	Cabinet Thermostat and Heaters Checked								
14	Megger Test Results: →	°C	kV	$M\Omega$					
	3Ф- Ground								
	$2\Phi - 1\&3\Phi$								
	1Φ Cont.								
	2Φ Cont.								
	3Φ Cont.								
15	Ductor Test Results (micro-ohms): →		Phase 1						
			Phase 2						
	Circle whether ductored via lead or bushing		Phase 3						
16	Check Sharepoint For Latest File Versions								
17	Ensure Proper Computer Software Version Installed								
18	Record Existing Firmware →								
18	Load and Record Latest Firmware →								
19	Load EMC Test Settings File for Testing								
20	Load IOEX File; Record File Name →								
21	Load DNP3 File; Record File Name →								
22	Load OCP File; Record File Name \rightarrow								
23	Print and Install New OCP label								
	OCP File Load Checks								
24	Setting Group A,B,C,D and Indication								
25	Ground Fault Protection								
26	Live Load Blocking								
27	Local ON								
27	Remote ON								
28	Auto Reclose ON								
28	Auto Reclose OFF								
29	Hold Off ON								
29	Hold Off OFF								
30	Check for English (USA) and Imperial Units								
31	Control Cable Check								
32	Check and Record SF6 psi →								
33	Contact Life Check; Record Values $(\Phi A, \Phi B, \Phi C) \rightarrow$								

Maintenance Type:	Date:		Maintenanceman:	 Supervisor:	
	_	(YYYY-MM-DD)			

		MSF016
34	Battery Labelled and Date Recorded →	
35	Record Amp Hour Rating of Battery →	
36	Battery Tested	
37	Battery Replaced	
	Function Checks	
38	Local Trip	
39	Close Isolate Switch	
41	Local Close	
40	Trip Isolate Switch	
42	Mechanical Trip by External Trip Lever	
43	Local Close Fails With HOLD OFF ON (Hot Line Tag)	
44	Low Gas Alarm Checked	
	IOEX Checks	
44	Trip Nulec From IOEX	
45	Close Nulec From IOEX	
46	No Close From IOEX with HOLD OFF ON (Hot Line Tag)	
47	Close From IOEX with AUTO RECLOSE OFF	
48	A Contact	
49	B Contact	
50	Protection On / Off	
	Primary Injection Checks	
51	Phase A, B, C and Ground Primary Current Minimum Trips	
52	Trip and Reclose Sequence Correct and Goes to Lockout	
53	Phase Target, Check Event Log For Correct Phase Max Fault Value	
54	Display Shows Correct Phase and Ground Amps	
55	Verify When Reclose is Off Unit Goes to Lockout, No Reclose	
56	Operation of Cold Load Function Checked	
57	Inrush Restraint Function Checked	
58	Reset after Elapsed Time on Successful Reclose	
59	Ground Trip Block Functional	
60	Substation Equipment Designation Attached	
61	Laminated Operating Procedures in Cabinet	
62	Documentation Distributed	
63	Maintenance Record Updated in Avantis	
64	Deficiencies Flagged in Avantis	
Enter De	etails of Faults Found and Corrective Actions:	
		_
	(add copies of MSF018 for addit	ional comments as required)
Maint. T	ype: Date Maintenanceman Superv	isor



MSF017 Form No.

Maintenance Standard Report Form

Revised: 2005-02-16 BATTERY DISCHARGE									
Substation/Location:		Manufacturer:		Work Order N	lumber:	ID Number:			
	Time:								
	tart O/C Volts:								
	Load Current:								
D	ischarge Time:								
Elec	ctrolyte Temp.: Pilot Cell SPG:								
	Phot Cell SPG:								
Cell #	SPG at Start		`	Volts at Specifie	ed Time Inter	val			
1									
2									
3 4									
5									
6									
7									
8									
9									
10 11									
12									
13					1				
14									
15									
16									
17									
18 19									
20									
21									
22									
23									
24									
25									
26 27									
28									
29						1			
29 30									
31									
32									
33								1	
34 35					1				

Date:		Completed By:
	(YYYY-MM-DD)	

									MSF017
Cell #	SPG at Start			Vol	ts at Specified	d Time Interv	al		
40									
41 42									
42									
43									
44 45									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
49 50 51 52 53 54 55 56 57 58 59 60									
58									
59									
60									
D l	_								
Remarks	·								
-									
-									
-									
		-	-		-		-	-	·

MSF018



Revised: 2005-02-16

Maintenance Standard Report Form **GENERAL COMMENTS**

Work Order No.:	ID Number:
D. /	
Date:	Completed By:

MS	SF018



BOA™ Breaker Oil Analysis Oil Circuit Breaker Sample Data



PUB-NP-064, Attachment F

RETURN CONTAINERS TO: REP			PORT & INVOICE TO:			REPORT TO:		
Phone:Fax:	Ne Bo St. Phon	John's, e:	land Po 55 Ken NF A1 (709) 7	mount I	2	Phone: Fax:		
P.O. # S	ampled 1	Ву:				1		
Sample Location (Substation/PH/PP) Equipment / Company Number Serial Number (Nameplate) Manufacturer (Nameplate) Date of Manufacture (Nameplate) Model Number / Type (Nameplate)						No	ites:	
Voltage Rating (Nameplate)								
Fluid Volume (Nameplate)								
	2 3		ank No.			ank No. 2	Tank No. 3	
Phase Interpreting Poting (KA) (KVA) (MVA)		□ A	□В	□С	□ A	□ B □ C	\Box A \Box B \Box C	
Interrupting Rating (KA) (KVA) (MVA) Amp Rating								
Present Counter Reading								
Oil Temperature								
No. of switching operations since last internal in:	spection							
Number of fault operations since last internal ins	_							
Present Accumulated Fault Count (ACC)				%				
Date of last internal inspection								
Date oil was last filtered								
Date oil was last replaced								
Sample Date								
DGA Syringe Sample No.								
Oil Quality Sample No.								
Status:			Routin	ie		Routine	☐ Routine	
Lab Use Only								
All Tests below are Required for BO)A Diagno	stics				Optional Tes	ts	
Dissolved Gas Analysis (D-3612) Particle Counts Moisture in Oil (D-1533B) Dielectric Breakdown (D-1816) Interfacial Tension (D-971) Acid Number (D-974) Color (D-1500) Instructions: All DGA samples are taken using a glass syring				□ PCB (EPA-8080) □ Metals (D-3635 ICP) □ Microscopy □ Other				

Instructions: All DGA samples are taken using a glass syringe or stainless steel cylinder. All oil quality tests samples are taken using a 1 qt plastic bottle. OCBs containing more than 350 gallons of oil require one gallon of oil to be flushed through the fill/drain valve prior to collecting samples. OCBs containing less than 350 gallons of oil require one quart of oil to be flushed through the fill/drain valve prior to collecting samples.

Send Samples to: TJH2b Analytical Services Canada Inc.

Bay #1, 2835-19 Street NE

Calgary, AB Phone (403) 282 8542 T2E 7A2 Fax (403) 282 8593



BOA™ Breaker Oil Analysis Oil Circuit Breaker Sample Data



PUB-NP-064, Attachment F

\square Routine Test \square Retest \square T	This is a Return to Service Test
---	----------------------------------

Send Samples to: TJH2b Analytical Services Canada Inc.

Bay #1, 2835-19 Street NE

 Calgary, AB
 Phone (403) 282 8542

 T2E 7A2
 Fax (403) 282 8593



TCA™ Transformer Condition Assessment Transformer Fluid Sample Data



RETURN CONTAINERS TO:		REPORT & INVOICE TO:			TO:	REPORT TO:		
			Box 891	amms ndland Power 0, 55 Kenmount s, NF A1B 3P6				
Phone:		F	hone:	(709) 737-570	02	Phone:		
Fax:			Fax:			Fax:		
P.O. #		amnl	led By:_					
	(Substation/PH							
Sample Location Equipment Number	(Substation/PF	1/PP)						
Bank and Phase								
Serial Number	(Nomanlata	.)						
	(Nameplate							
Manufacturer	(Nameplate							
Date of Manufacture	(Nameplate	•						
Where Manufactured	(Nameplate							
kVA Rating	(Nameplate							
Primary kV	(Nameplate							
Secondary kV	(Nameplate							
Tertiary kV	(Nameplate							
Fluid Volume	(Nameplate							
Fluid Preservation	(Nameplate							
Cooling	(Nameplate							
Core & Coil Weight Oil Filtered/Unit Serviced	(Nameplate (Yes/No)	2)						
Reason for test	(Yes/No)							
Winding Temperature								
Top Oil Temperature								
					1			
Sample Date								
Syringe No.								
Bottle No.								
Status:								
Lab Use Only								
	All	Tests	below are	Required for TC	A Diagno	ostics		
☐ Dissolved Gas An						erfacial Tension (D-9	971)	
☐ Particle Profile					Col	or (D-1500)		
☐ Moisture in Oil (□	D-1533B)				Pov	wer Factor (D-924)		
☐ Dielectric Breakd					Oxi	idation Inhibitor		
☐ Acid Number (D-				Fur	furals			
Instructions: All DGA samples are taken using a glass syringe or stainless steel cylinder. All oil quality test samples are taken using a							amples are taken using a	
1 qt plastic bottle. Flush one gallon of oil th				-	cting samp			
☐ Routine Test			☐ Retes	st		☐ This is a Re	eturn to Service Test	

Send Samples to: TJH2b Analytical Services Canada Inc.

Bay #1, 2835-19 Street NE

Calgary, AB Phone (403) 282 8542 T2E 7A2 Fax (403) 282 8593



TASA™ Tapchanger Activity Signature Analysis LTC Fluid Sample Data



Fax (403) 282 8593

PUB-NP-064, Attachment F

RETURN CONTAINE	REPORT	Γ & INVOICE T	ГО:	REPORT TO:		
		Box 891	amms ndland Power 0, 55 Kenmount 's, NF A1B 3P6	Road		
Phone:		Phone:	(709) 737-570	12	Phone	
Fax:			(709) 737-292		Fax:	
			(10)) 131 2)2		<u> </u>	
P.O. #	S	ampled By: _				
Sample Location	(Substation/PH	(/PP)				
Equipment Number						
Bank and Phase						
Serial Number	(Nameplate	2)				
Manufacturer	(Nameplate	(a)				
Model	(Nameplate					
Tank/Compartment	, , ,					
Breathing/Ventilation						
Selector Contact Type						
Transfer Contact Type LTC Location		+				
Tap to Tap Rating						
Current Rating						
Fluid Volume						
Counter						
Oil Filtered/Unit Serviced	(Yes/No)					
Reason for test	,					
Xfrmr Oil Temperature						
LTC Oil Temperature						
Sample Date						
Syringe No.						
Bottle No.						
Status:						
Lab Use Only						
	All 7	Tests below are I	Required for TAS	A Diagnos	tics	
☐ Dissolved Gas Ar					Number (D-974)	
Particle Profile	, ,				acial Tension (D-	971)
☐ Moisture in Oil (I	D-1533B)		П		(D-1500)	,
☐ Dielectric Breakd			_		(=)	
Instructions: All DGA sam		ing a glace evring	re or stainless steal	cylinder A	ll oil quality test	samples are taken using o
1 qt plastic bottle. LTCs cont collecting samples. LTCs conta	aining more than 3	350 gallons of oil re	equire one gallon of	oil to be flus	hed through the fill	drain valve prior to
samples. Routine Test		□ Retes	t	1	☐ This is a Re	turn to Service Test
Cand Cam1-	ato. TIIIA	Analytical C	ourion Come 1	Inc		
Send Sample) Anaiyucai S ., 2835-19 Str	ervices Canada eet NE	a Inc.		
	Calgar			P	Phone (403) 28	2 8542

T2E 7A2

				AL DU	40 DOWED F	A OTOD INIOLII	ATION TEO					
				ALPH		ACTOR INSUL NG TRANSFO						
			APPAF	RATUS INFORM						GER LIMITED		
									TYPE: 01-A10	TWO WINDING	SXFRMS	
DATE:		1	(MM/DD/YY)						ENT	VIDONMENT		
COMPANY:									EN	VIRONMENT		
TRANSFORMER	R LOCATION:			DESIGNATION:			=					
									WEATHER:		-	
			TRANSFOR	RMER NAME PI	LATE DATA				AIR TEMP:		-	
MFGR:			S/N:			YEAR:		_	OIL TEMP:		-	
TYPE:						FORM:			WINDING TEMP:		G XFRMS C C C C C W Insulation Rating	
HIGH SIDE KV:	Y	\		LOW SIDE KV:		Y	Δ		REL. HUMIDITY:		_ %	
	TES	T CONNECTION	ONS				EΩI IIVAI EN	T 10KV TEST R	ESHLTS			
	120	CONNECTA	<u> </u>	-					LOGETO	1		
							Power	Powe	r Factor (%)		Inquiation	
TEST NO.	H.V.	CxRED		Menu Select	Voltage (V)	Current (mA)	(mW)	Measured	Correct to 20°C	CAP. (pf)		
1	High	Low		1R[G+B]								
,	High	Low		5G[R+B]								
	riigii	LOW		ЗО[К+Б]								
*3	High	Low		6R+G[B]								
**4	High	Low		1R[G+B]								
5	Low	High		5G[R+B]								
	LOW	riigii		ЗО[К+Б]								
6	Low	High		6R+G[B]								
							readings for T	est No's 1+2+4	. Ideally they should b	be the same.		
	he results of this						Watts readin	as for Test No's	5&6. Ideally they sho	ould he the sam	16	
Compare	пе оараспанос	and watto ici	adings of this	test against the		RESULTS:		93 101 103(140 3	odo. Ideally they she	Jaia De trie Jair	10.	
DIELECTRIC	STRENGTH TE	ST						WER FACTOR				
STD USED:	1816 877			T 1/01 T1 05	0	1	TEST RE		1	1		
AVG. BF	REAKDOWN	STD	. DEV.	VOLTAGE (KV)	CURRENT (mA)	Power (mW)		Factor % Corr to 20°C	CAP. (pf)	Insulation	on Rating	
						<u> </u>						
REASON FO	R TESTING:						OIL CELL S	.N.				
WORK ORDI	ER NO:						ALPH-10 S/	N:				
TESTED BY:							LAST DATE	TESTED:	/ / (MM/DD/Y	Y)		
CHECKED B	Y:						DATE CHEC	CKED: /	/ (MM/DD/YY)			
	<u>: : </u>								. (
COMPANY:												
	JT.								CHEET NO:			
DEPARTMEN	NI.								SHEET NO:			
REMARKS:												

OIL CIRCUIT BREAKERS

Capacitance and Power Factor Tests

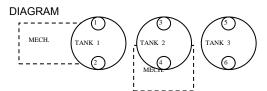
-			
COMPANY			DATE
TEST LOCATION			TESTED BY
BREAKER IDENT.			TEST SET NO.
BREAKER SERIAL NO.			AIR TEMPERATURE
BREAKER MFR.	TYPE		OIL TEMPERATURE
BREAKER KV	AMPS		% RH
BUSHING MFR.	TYPE	KV	WEATHER

CIRCUIT BREAKER OVERALL TESTS

TEST NO.	СВ	INSULATION	4	TEST	TEST BUSHINGS TEST TANCE	.5KV	INSULATION											
	OB	TESTED	φ	MODE	ENG	GND	GAR	UST	KV	C(PF)	MEASU RED	20°C %PF	CORR FCTR	mA	watts	mA	watts	RATING
1		C _{1G}		GST GND	1													
2	ا ٍ ا	C 2G		GST GND	2													
3	O P	C _{3G}		GST GND	3													
4	E N	C _{4G}		GST GND	4													
5		C _{5G}		GST GND	5													
6		C _{6G}		GST GND	6													
7	C L	C _{1G} + C _{2G}		GST GND	1&2													
8	0 S	C C 4G		GST GND	3&4													
9	E D	C _{5G} + C _{6G}		GST GND	5&6													

BUSHING & OIL TESTS

TEST		BUSHING										
	NO.	SER. NO.	φ									
10	1			UST	1	TAP						
11	2			UST	2	TAP						
12	3			UST	3	TAP						
13	4			UST	4	TAP						
14	5			UST	5	TAP						
15	6			UST	6	TAP						
16		TANK 1 OIL		UST								
17		TANK 2 OIL		UST								
18		TANK 3 OIL		UST	,						_	



Note: Circuit breaker open: bushing tests

(Test No. 1, 2, 3, 4, 5 and 6). Circuit breaker closed: Tank tests

(Test No. 7, 8 and 9)

AVO INTERNATIOINAL P.O. Box 9007 Valley Forge, PA 19484-9007 REMARKS;

INSULATION RATING KEY

G = GOOD

D = DETERIORATED I = INVESTIGATE

B = BAD (REMOVE OR RECONDITION)

INSULATION TESTED

Note: No. in ENG column is bushing energized, all other bushings must be floating.

Note: Subscripts are test no's. index may be positive or negative

TANK LOSS INDEX

TWO WINDING TRANSFORMER

Capacitance and Power Factor Tests

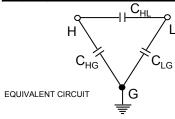
COMPANY				DATE				
TEST LOCATION				TESTED BY				
XFMR IDENT.				TEST SET NO.				
XFMR SERIAL NO.				AIR TEMPERATURE				
XFMR MFR.	TYPE	KVA		OIL TEMPERATURE				
HIGH KV	SGL □	Υ□	Δ 🗆	% RH				
HIGH KV BUSH				WEATHER				
LOW KV	SGL □	Υ□	Δ	TERTIARY KV	SGL	Υ□	Δ	
LOW KV BUSH				TERTIARY BUSH				

TRANSFORMER OVERALL TESTS

TEST#	INSULATION TESTED	TEST MODE	TES	TEST CONNECTIONS (WINDINGS)		TEST CAPACITAN					EQUIV. 10KV		EQUIV. 2.5KV		INSUL- ATION	
1231#		TEST MODE	ENG	GND	GAR	UST	KV	CE C(PF)	MEASUR- ED	20°C %PF	CORR FCTR	Ма	WATTS	Ма	WATTS	RATING
1	C + C HG HL	GST GND	Η	L												
2	C HG	GST	Ι		L											
3	C _{HL}	UST	Н			L										
4	C _{HL}	<>	TES	T 1 MIN	NUS TE	ST 2	\									
5	C _{LG} + C _{HL}	GST GND	┙	Н												
6	C LG	GST	L		Н											
7	C _{HL}	UST	L			Н										
8	C _{HL}	<>	TES	T 5 MIN	IUS TE	ST 6	\									
9	C _{HG'}	<>	C_{HG}	MINUS	HIGH E	BUSH.	\									
10	C _{LG'}	<>	CLG	MINUS	HIGH E	BUSH.		·								

BUSHING TESTS

TE	OT 4	BUSHING									
Ľ	ST#	SER. NO.	ϕ	UST							
	11		Α	UST							
н	12		В	UST							
kV	13		C	UST							
	14		Ν	UST							
	15		Α	UST							
LO	16		В	UST							
kV	17		C	UST							
	18		Ζ	UST							
	19	OIL TEST		UST							



P.O. Box 9007

Valley Forge, PA 19484-9007

INSULLATION RATING KEY

G = GOOD

REMARKS

D = DETERIORATED

I = INVESTIGATE

B = BAD (REMOVE OR RECONDITION)

H = HIGH - VOLTAGE WINDING

Test No. 4, 8, 9, 10 are calculated

L = LOW - VOLTAGE WINDING

intercheck values.

G = GROUND AVO INTERNATIOINAL

N = NEUTRAL BUSHING

NOTE: SHORT EACH WINDING ON ITSELF letter in ENG columm = winding energized.

THREE WINDING TRANSFORMER

Capacitance and Power Factor Tests

			Oup	acita		and I owel I actor rests
COMPANY						DATE
TEST LOCATION						TESTED BY
XFMR IDENT.						TEST SET NO.
XFMR SERIAL NO.						AIR TEMPERATURE
XFMR MFR.	TYPE		KVA			OIL TEMPERATURE
HIGH KV	SGL	Υ		Δ		% RH
HIGH KV BUSH						WEATHER
LOW KV	SGL	Υ		Δ		TERTIARY KV SGL 🗆 Y 🗆 🛕 🗆
LOW KV BUSH						TERTIARY BUSH
	•	•	TRA	NSF	ORI	MER OVERALL TESTS

TEST#	INSULATION TESTED	TEST	TES	TEST CONNECTIONS (WINDINGS)			TEST	CAPACITAN				EQUI	/. 10KV	EQUIN	/. 2.5KV	INSUL- ATION
1231#		MODE	ENG	GND	GAR	UST	KV	CE C(PF)	MEASUR- ED		CORR FCTR	Ма	WATTS	Ма	WATTS	RATING
1	C _{HG} + C _{HL}	GST	Н	┙	Т											
2	^C HG	GST	Н		L&T											
3	C _{HL}	UST	Н	Τ		L										
4	C _{HL}	>	TE	ST 1 mii	nus TES	T 2	>									
5	C _{LG} + C _{LT}	GST	L	T	Н											
6	^C LG	GST	L		T&H											
7	C _{LT}	UST	L	Н		Т										
8	C _{LT}	<>	TE	ST 5 mii	nus TES	T 6	<>									
9	^С тв + ^С НТ	GST	T	Н	L											
10	^C TG	GST	T		H&L											
11	C _{HT}	UST	Т	L		Н										
12	C _{HT}	<>	TES	ST 9 min	us TES	T 10	<>									
13	C _{HG'}		C	minus	HIGH B	USH.	\									
14	C _{LG'}		C	3 minus	LOW BU	JSH.	\									
15	C _{TG'}		C TG m	inus TE	RTIARY	BUSH.										

BUSHING TESTS

TE	ST#	BUSHING									
	31 #	SER. NO.	φ	UST							
	16		Α	UST							
н	17		В	UST							
kV	18		С	UST							
	19		Ν	UST							
	20		Α	UST							
LO	21		В	UST							
kV	22		С	UST							
	23		N	UST							
	24		Α	UST							
Т	25		В	UST							
kV	26		С	UST							
	27		Ν	UST							
	28	OIL TEST		UST							

INSULLATION RATING KEY

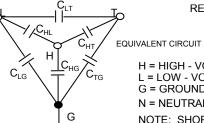
G = GOOD

D = DETERIORATED

I = INVESTIGATE
B = BAD (REMOVE OR RECONDITION)

Test No. 4, 8, 12, 13, 14 & 15 are calculated intercheck values.

AVO INTERNATIOINAL P.O. Box 9007 Valley Forge, PA 19484-9007



REMARKS

H = HIGH - VOLTAGE WINDING L = LOW - VOLTAGE WINDING

G = GROUND

N = NEUTRAL BUSHING

NOTE: SHORT EACH WINDING ON ITSELF

Letter in ENG columm = winding energized.



MSF026 Revised 2006-01-12

Maintenance Standard Report Form TAP CHANGER RECORDING FORM

SUBSTAT	ION TRANSFORMI	ER:	TRANSFORMER CO	MPANY NUMBER:								
SCC VOL	TAGE REQUIRED:	S	CADA TIME:	LOCAL TI	ME:							
VOLTAG	E REDUCTION - P	ROCEED ONLY A	FTER RECEIVING	INSTRUCTION FR	OM THE SCC OPERA	ATOR						
S	CC Operator:		Time	e of Instruction:								
1. Take th	ese readings (if avai	lable) IMMEDIATE	LY BEFORE changin	ng any tap position:	,							
	LOCAL TIME	MEGAWATTS	XFMR AMPS	VOLTAGE	TAP POSITION							
2. Tales 4le	(if)		IV A DIDED in:4:al 4aa			J.						
2. Take th	LOCAL TIME	MEGAWATTS	XFMR AMPS	VOLTAGE	get to voltage required TAP POSITION	1:						
3. Take th	ese readings (if avai	lable) at 15 MINUTE	INTERVALS to kee	p the required volta	ge:							
	LOCAL TIME	MEGAWATTS	XFMR AMPS	VOLTAGE	TAP POSITION							
RETURN	TO NORMAL - PR	OCEED ONLY AF	TER RECEIVING IN	NSTRUCTION FRO	M THE SCC OPERA	ΓOR						
S	CC Operator:		Time	e of Instruction:								
4. Take th	ese readings (if avai	lable) IMMEDIATE	LY AFTER tapchang	ger returns to final p	osition for NORMAL v	oltage:						
	LOCAL TIME	MEGAWATTS	XFMR AMPS	VOLTAGE	TAP POSITION							
Ĺ												
	neter leads removed nent returned to its o	from control panel? original operating sta	Yes No te? Yes No	(please circle) (please circle)								
Signatura			Dete	Completed								
Signature:				•								
			S OR REMARKS O SYSTEM CONTRO									



MSF027 Revised 2011-02-08

Maintenance Standard Report Form VOLTAGE TRANSDUCER CHECK FORM

SUBSTATION: EQ	QUIP MONITORED:	TRANSDUCER SERIAL No:
NOTE: Please review test procedure	e MST018 before completing th	is form
1. AC VOLTAGE MEASUREMEN	T (Range: 110 to 125 Volts, 1 D	pecimal Place X.X):
	AC VOLTAGE	(Vin)
2. DC VOLTAGE MEASUREMEN	T/CALCULATION (Range: 0 t	to 5 Volts, 3 decimal places, X.XXX):
	VDC meas VDC calc	% ERROR
3. SCADA VOLTAGE READING (Ask SCADA Tech. to force pol	RTU or Gateway to refresh readings):
	RESULTS	
4. a) PANEL METER VOLTAGE F	READING:	
	RESULTS	
4. b) RELAY VOLTAGE READING	G:	
	RESULTS	
	RES CETE	
Required Equations:		
Voltage Transducer Full Scale: 150 V Calculated VDC out: VDCcalc = (Vi Measured VDC out: Step 2		s RTU point
Calculated VDC out should equal m	neasured VDC out across transc	lucer or RTU input
Percent Error Calculation: % Error NOTE: If % Error is 1% or less, the	` '	Ccalc*100
Signature:		Date Completed:
SCC operator and/or SCADA Technic	ian:	
2. COMPLETED FORM TO	BE SCANNED AND FORWAL	THE REVERSE OF THIS FORM RDED TO PLANNER RRATIONAL SUPPORT FOR ADDITIONAL

INVESTIGATION IF THE TRANSDUCER PASSED THE TEST



MSF028 Revised 2011-03-29

Maintenance Standard Report Form POWER TRANSDUCER CHECK FORM

SUBSTATION:	EQUIF	P MONITORED:	Tl	TRANSDUCER SERIAL No:					
NOTE: Please revie	ew test procedure MS	ST019 before comple	ting this form						
1. a) AC VOLTAGI	E MEASUREMENT			Place X.X):	1				
			TAGE VALUE		-				
	Ph	ase A	Phase C	V Avg	-				
		<u> </u>			1				
1. b) AC CURREN	T MEASUREMENT	`		s X.XXX):					
		AC CURRE	I	1					
	Phase A	Phase B	Phase C	I Avg	_				
2. DC VOLTAGE N	MEASUREMENT/C				XXX):				
	Output W		ER VDC OUTPUTS ut VAR (VDCv)	VDCt	-				
	Output	rati (VDCW) Outpo	at vine (vbev)	VDCt					
		l			1				
3. SCADA POWER	R READINGS (Ask S		<u> </u>	way to refresh rea	adings):				
		MW	MVAR						
4. CALCULATION									
	VA Expe	ected (VAcalc) VA	Measured (VAmea	s) % Error					
5. a) PANEL METI	ER READINGS:								
		MVA	MVA Multipli	er					
5. b) RELAY REAI	DINGS:	ī							
		3 Phase MW	3 Phase MVA	AR					
Required Equation	s:								
Percent Error: %Err	of transducer: VDCt = ror = (VAmeas – VAc r is 5% or less, then t	calc) / VAcalc * 100			alc = (VDCt * 1500) / 5 eas = 3*Vavg*Iavg				
Signature:			Date Comple	eted:					
SCC Operator and/or	r SCADA Technician	:							
1. PLEASE M	MAKE ANY COMM	ENTS OR REMARI	KS ON THE REVE	RSE OF THIS FO	ORM				

2. IF TRANSDUCER PASSED RECORD ADDITIONAL WORK FOR OPERATIONS SUPPORT GROUP ON AVANTIS WORK REQUEST. 3. COMPLETED FORM TO BE SCANNED AND FORWARD TO PLANNER

NEWFOUNDLAND	/ED			MSF029 Revised 5-30-2006
A FORTI	S COMPANY	Padmount Ir	nformation Forn	<u>n</u>
Company	Number:		Serial Number:	
Manu	facturer:		Manufacture Date: _	
Old Comp (If Ap	any No.:			
Ratir	ng (kVA):	Weight (kg)	: Oil C	apacity (litres):
	Primary Voltag	e (kV):	Secondary Voltage (kV	/):
Primary Co	onnections:	Elbows	Open Lugs	
Primary Co	onfiguration:	Delta	Wye	Single Phase
PCB Level	(PPM):			
		Lab Tested	Clor-N-Oil	White Label
Tests:	Dielectric Oil	Pass	Fail	
	Ratio			
	Megger			
Notes:				
Tested B	y:		Date: _	
	Keyed in Avanti			

Cape Broyle Substation



Substation/Location:

MSF030 - CAB Revised: 2006/12/08

Work Order Number:

Maintenance Standard Report Form

Manufacturer:

Cape Broyle Su	Тетр	eratui	re:		°C			Weather: Wet or Dry			
Form to be com Please indicate		status	s color	for ea				Green	mber	R - Red)	
			Front					Back			
Cubicle	ubicle Ultrasonic TEV Ultrasonic G R G A R G R								TEV A	R	Comments
CAB-FLD-B	0	I	9	А	- 1	G	K	G	А	IX	
CAB-G-B											
CAB-SS											
CAD-55	+									<u> </u>	
Type of Mainte	nance: _		_	Date:		(YYYY-	-MM-D	(DD)	_	Inspe	ected By:

Grand Falls Substation



MSF030 - GFS Revised: 12/8/2006

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location:	Manufacturer:	Work Order Number:
Grand Falls Substation		
	Temperature:°C	Weather: Wet or Dry

 $Form\ to\ be\ completed\ for\ Partial\ Discharge\ tests\ using\ UltraTEV.$

Please indicate (1) LED status color for each cubicle. (G - Green A - Amber R - Red)

	Front					Back					
Cubicle	Ultra	sonic		TEV		Ultra	sonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
GFS-132-B											
GFS-T4-B											
GFS-06-B											
GFS-01-B											
GFS-05-B											
GFS-03-B											
GFS-04-B											
GFS-T5-B											
GFS-SS											

Type of Maintenance:	Date:		Inspected By:	
		(YYYY-MM-DD)		

Greenhill Substation



Substation/Location: Greenhill Substation MSF030 - GRH

Revised: 2006/12/08

Work Order Number:

Maintenance Standard Report Form

Manufacturer:

ubicle			Front	,				Back			
		sonic		TEV			sonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
56KV											
	+										
	+										
	+										
	-										
	+										
	+					-					
	+										

Horse Chops Substation



Substation/Location:

MSF030 - HCP

Revised: 2006/12/08

Work Order Number:

Maintenance Standard Report Form

Manufacturer:

Horse Chops Su	Horse Chops Substation Temperature:°C								Weather: Wet or Dry		
From to be completed for Partial Discharge tests using UltraTEV. Please indicate (√) LED status color for each cubicle. (G - Green A - Amber R - Red)											
			Front	t				Back			
Cubicle	Ultra	asonic		TEV		Ultra	asonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	7
HCP-SS-C											
HCP-SS-F											
HCP-SS											
HCP-G-B											
HCP-EX											
	1										
Type of Mainter	nance: _		_	Date:		(YYYY-	-MM-D)D)	_	Inspe	ected By:

Humber Substation



MSF030 - HUM

Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location:	Manufacturer:	Work Order Number:
Humber Substation		
	Temperature:°C	Weather: Wet or Dry

Form to be completed for Partial Discharge tests using UltraTEV.

Please indicate (1) LED status color for each cubicle. (G - Green A - Amber R - Red)

	Front					Back					
Cubicle	Ultra	sonic		TEV		Ultra	sonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
HUM-03-B											
HUM-05-B											
HUM-T2-B											
HUM-07-B											
HUM-01-B											
HUM-BTB-1											
HUM-06-B											
HUM-02-B											
HUM-T1-B											
HUM-04-B											

Type of Maintenance:	Date:	Inspected By:	
	(YYYY-MM-DD)		

Kings Bridge Substation



MSF030 - KBR

Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location:	Manufacturer:	Work Order Number:
Kings Bridge Substation		
	Temperature:°C	Weather: Wet or Dry
		,

Form to be completed for Partial Discharge tests using UltraTEV.

Please indicate ($\sqrt{\ }$) LED status color for each cubicle. (G - Green A - Amber R - Red)

	Front					Back					
Cubicle	Ultra	sonic		TEV		Ultra	sonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
KBR-AUX											
KBR-01-B											
KBR-02-B											
KBR-08-B											
KBR-04-B											
KBR-T1-B											
KBR-T2-B											
KBR-03-B											
KBR-07-B											
KBR-06-B											
KBR-05-B											
KBR-TB-3-5											
KBR-12-B											
KBR-11-B											
KBR-10-B											
KBR-09-B											
KBR-T3-B											
KBR-TB-3-4											

Type of Maintenance:	Date:		Inspected By:	
		(YYYY-MM-DD)		

Lookout Brook Substation



MSF030 - LBK

Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location:	Manufacturer:	Work Order Number:
Lookout Brook Substation		
	Temperature:°C	Weather: Wet or Dry
,		•

Form to be completed for Partial Discharge tests using UltraTEV.

Please indicate (1) LED status color for each cubicle. (G - Green A - Amber R - Red)

			Front	,		Back					
Cubicle	Ultra	sonic		TEV		Ultra	sonic	c TEV			Comments
	G	R	G	A	R	G	R	G	A	R	
LBK-FLD-B											
LBK-G3-B											
LBK-G2-B											
	1										
	1										
	1										
	1										
	1										
	1										

Type of Maintenance:	Date:		Inspected By:	
		(YYYY-MM-DD)		

Lockston Substation



MSF030 - LOK

Revised: 2006/12/08

Maintenance Standard Report Form

Substation/Loca	tion:		Manufacturer: Work Order Number:						Work Order Number:		
Lockston Substa	Lockston Substation										
	Temperature:°C								Weather: Wet or Dry		
				_							
Form to be com Please indicate											D D.J.
Please indicate ((v) LED	status	s color	ior ea	ich cui	oicie.	(G - G	reen	A - AI	nber	R - Rea)
			Front	:				Back			
Cubicle		sonic		TEV		Ultra	sonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
LOK-SPARE											
LOK-G1-B											
LOK-EX1											
LOK-EX2											
LOK-G2-B											
LOK-01-B											
LOK-T1-B											
LOK-FBL-B											

Type of Maintenance:	Date:	Inspected By:	
		(YYYY-MM-DD)	



MSF030

Maintenance Standard Report Form **METERING TANKS**

		_
Revised: 2009-06-23	METERING 1	TANK

Substation/Location:		Work Order No.:		ID Number:			
Amps:	Volts:		Manufacturer:		Serial #:		

Check each item with a ✓ for OK, X to indicate a problem, N/A for not applicable, or N/D for not done. Initial each entry.

#	Task			Status or Results	Initial
1	Maintenance history reviewed				
2	Maintenance standards reviewed				
3	Manufacturer information reviewed				
4	Nameplate info recorded				
5	External visual inspection				
6	Chlor-N-Oil Test				
7	PCB Lab Test Results (If Necessary)				
8	Checked Oil Levels & Leaks				
9	Initial Oil Dielectric kV				
10	Meggered OK				
11	CT Ratio Test				
12	PT Ratio Test				
13	Oil removed for inspection				
14	Tank & components cleaned				
15	Tank vents cleaned				
16	Internal visual inspection				
17	Tank repaired & prepared for painting				
	Bushings & gaskets				
	Cover gasket				
	Secondary terminals gasket				
	Secondary terminations clean, tight and identified				
	Bushing & ground terminals clean and tight				
18	HV Bushings identified				
19	Drain valve present & secure				
20	Finish refilling to correct level		1		
25	Final Megger Test Results:	°C	kV	MΩ	
	3φ - Ground				
	2φ-1&3φ				
	PT HV-LV				
	CT HV-LV				
	PT LV-Ground				
	CT LV-Ground				
26	Final Oil Dielectric kV				
27	Final CT Ratio				
28	Final PT Ratio				
30	Painting				
31	PCB Sticker Installed for ppm				
32	ID # Installed				
33	Shipping plugs installed and identified prior to shipping				
34	Documentation distributed				

М	S1	EΩ	1	Q

CT Ratio Test Re	sults: Test Metho					
		Result	Initial		Result	Initial
H1A/H2A – C1A/0				H1A/H2A – C1A/C2A		
H1B/H2B - C1B/C				H1B/H2B – C1B/C2B		
H1C/H2C - C1C/C	C3C]	H1C/H2C - C1C/C2C		
DED II E ID						
PT Ratio Test Res	sults: Test Metho			1		T * * * * * T
111 4 /110 - 171 4 /17	2.4	Result	Initial	**************************************	Result	Initial
H1A/H0 – V1A/V2 H1C/H0 – V1C/V2				*H1B/H0 – V1B/V2B		
Enter details of fau				led to perform this test if unit is 3		
			(ottoo	h copies of MSF018 for ad	ditional commants o	c required)
			(attac	in copies of Misi-ora for ad	ditional comments a	<u>.s requireu)</u>
N. J. 100	D 4		34.1.4		g .	
viaint. Type:	_ Date:	VVV MM DD)	Maintena	nceman:	Supervisor	
	(YY)	TT-MM-DD)				

Mobile Substation



Substation/Location:

MSF030 - MOB Revised: 2006/12/08

Work Order Number:

Maintenance Standard Report Form

Manufacturer:

Mobile Substatio	n		Tomn	eratui	•••	(C.				Weather: Wet or Dry
Form to be comp Please indicate (tial Di	ischarg	ge test	s using	g Ultra		A - Aı	mber	
			Front	;				Back			
Cubicle		sonic	-	TEV	n		sonic	-	TEV	п	Comments
MOB-G-FLD-B	G	R	G	A	R	G	R	G	A	R	
MOD GILD D											
Type of Mainten	ance: _		_	Date:		(<i>YYYY-</i>	 -MM-D	DD)	_	Inspe	ected By:

Memorial Substation



MSF030 - MUN Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Loca	ation:		Manı	ıfactur	er:						Work Order Number:
Memorial Subs	tation										
			Temp	eratui	re:	(C.				Weather: Wet or Dry
Form to be com Please indicate									A - Ar	nber	
			Front					Back			
Cubicle		sonic		TEV			sonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
MUN-T2-B											
MUN-10											
MUN-09-B											
MUN-08-B											
MUN-07											
MUN-PT											
MUN-TIE											
MUN-06-B											
MUN-05-B											
MUN-04-B											
MUN-03-B											
MUN-02-B											
MUN-01-B											
MUN-SS											
MUN-T1-B											
								_			

Page 1 of 1

(YYYY-MM-DD)

Inspected By: _____

Type of Maintenance: _____ Date: ____

Port Aux Basques Substation



MSF030 - PAB

Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Loca	ation:		Manu	ıfactuı	er:						Work Order Number:
Port Aux Basqu	ies Subs	tation									
			Temp	eratui	re:		C.				Weather: Wet or Dry
7	1 4 10						T 714	(DE) \$ 7			
Form to be com Please indicate									Δ - Δ1	mher	R - Red)
icase marcate	(1) LED	Status	COIOI	101 Ca	cii cui	icic.	(0 - 0)	ncen	71 - 711	inder	K - Keuj
			Front					Back			
Cubicle		sonic	-	TEV	ъ		sonic		TEV	ь	Comments
AD CO D	G	R	G	A	R	G	R	G	A	R	
AB-G8-B AB-G4-B											
AB-G4-B AB-G1-B											
AB-G1-B PAB-G2-B											
PAB-T2-B											
PAB-G5-B											
AB-G3-B											
PAB-T1-B											
PAB-G10-B											
	-										
					-						
					-					-	

Type of Maintenance: _____ Date: _____ Inspected By: _____

Pierres Brook Substation



Substation/Location:

MSF030 - PBK

Revised: 2006/12/08

Maintenance Standard Report Form

Manufacturer:

SWITCHGEAR PARTIAL DISCHARGE TESTING

Pierres Brook S	ubstatio	n	Temp	eratu	re:		°C				Weather: Wet or Dry
Form to be comp Please indicate (pleted fo √) LED	status	s color	for ea	ge test ich cu	s using bicle.	g Ultra (G - C	Green	A - Aı	mber	R - Red)
			Front					Back			
Cubicle	Ultra G	sonic R	G	TEV A	R	Ultra G	asonic R	G	TEV A	R	Comments
PBK-G-FLD-B											
PBK-SS											
PBK-G-B											
Type of Mainter	nanca.			Data						Inche	octed Rv

(YYYY-MM-DD)

Pepperrell Substation



MSF030 - PEP

Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location:	Manufacturer:	Work Order Number:
Pepperrell Substation		
	Temperature:°C	Weather: Wet or Dry
•		

Form to be completed for Partial Discharge tests using UltraTEV.

Please indicate (1) LED status color for each cubicle. (G - Green A - Amber R - Red)

	Front							Back			
Cubicle	Ultra	sonic		TEV		Ultra	sonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
PEP-01-B											
PEP-02-B											
PEP-03-B											
PEP-04-B											
PEP-T1-B											
PEP-TB-1-3											
PEP-TB-1-2											
PEP-S/S											

Type of Maintenance:	Date:		Inspected By:	
		(YYYY-MM-DD)		

Petty Harbour Substation



Substation/Location:

MSF030 - PHR Revised: 2006/12/08

Work Order Number:

Maintenance Standard Report Form

Manufacturer:

Petty Harbour Substation Temperature:°C										Weather: Wet or Dry	
Form to be com Please indicate										mber	R - Red)
			Front	ţ				Back			
Cubicle		sonic		TEV			sonic	-	TEV		Comments
DUD T1 D	G	R	G	A	R	G	R	G	A	R	
PHR-T1-B											
	+										
	+										
	+										
Type of Mainte	nance: _		_	Date:		(YYYY-	-ММ-Д)D)	_	Inspe	ected By:

Pitman's Pond Substation



Substation/Location:

MSF030 - PIT Revised: 2006/12/08

Work Order Number:

Maintenance Standard Report Form

Manufacturer:

Pitman's Pond	Substatio	eratu	re:		°C				Weather: Wet or Dry		
Form to be com Please indicate		status	tial Di s color	ischar; · for ea	ge test	s using		Freen		mber	
			Front					Back			
Cubicle	Ultra G	sonic R	G	TEV A	R	Ultra G	sonic R	G	TEV A	R	Comments
PIT-LA											
PIT-G-B											
PIT-AUX-SS											
PIT-R&M											
Type of Mainte	nance: _		_	Date:		(YYYY-	-MM-D)D)	_	Inspe	ected By:

Rattling Brook Substation



Substation/Location:

MSF030 - RBK

Revised: 2006/12/08

Work Order Number:

Maintenance Standard Report Form

Manufacturer:

Rattling Brook S	ubstati	ion	Temp	peratui	re:		°C				Weather: Wet or Dry
Form to be comp Please indicate (\gamma			tial D	ischarg	ge test					mber	
			Front	t				Back			
Cubicle		asonic		TEV		Ultrasonic			TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
RBK-SPARE											
RBK-G1-B											
RBK-G1-FLD-B											
RBK-G2-B											
RBK-G2-FLD-B											
RBK-T1-B2											
RBK-T1-B1											
RBK-AUX-SS											
RBK-SS											
Type of Maintena	ance: _		_	Date:		<u>(YYYY-</u>	-MM-D	(DD)	_	Inspe	ected By:

Ridge Road Substation



MSF030 - RRD Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location:	Manufacturer:	Work Order Number:
Ridge Road Substation		
	Temperature:°C	Weather: Wet or Dry
•		

Form to be completed for Partial Discharge tests using UltraTEV.

Please indicate ($\sqrt{\ }$) LED status color for each cubicle. (G - Green A - Amber R - Red)

	Front							Back			
Cubicle	Ultra	sonic		TEV		Ultra	sonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
RRD-SS											
RRD-06-B											
RRD-01-B											
RRD-T1-B											
RRD-TB-2-3											
RRD-05-B											
RRD-04-B											
RRD-T2-B											
RRD-03-B											
RRD-02-B											
RRD-TIE-2-3-D											
RRD-T3-B											
RRD-07-B											
RRD-08-B											
RRD-09-B											
RRD-10-B											
RRD-TB-3-4											

Type of Maintenance:	Date:		Inspected By:	
		(YYYY-MM-DD)		

Sandy Brook Substation



Substation/Location:

MSF030 - SBK

Revised: 2006/12/08

Work Order Number:

Maintenance Standard Report Form

Manufacturer:

ed for Pa ED statu Itrasonic G R	is color	for ea			(G - G		TEV	nber R	R - Red) Comments
	:	TEV	R		sonic		_	R	Comments
	:	TEV	R		sonic		_	R	Comments
G R	G	A	R	G	R	G	A	R	
					\vdash				

Seal Cove Substation



MSF030 - SCV

Revised: 2006/12/08

Maintenance Standard Report Form

Substation/Location:	Manufacturer:		Work Order N	umber:
Seal Cove Substation				
	Temperature:	_°C	Weather: We	et or Dry
Form to be completed for Par	tial Discharge tests usi	ng UltraTEV.		
Please indicate ($$) LED status	s color for each cubicle	(G - Green A - Amber	R - Red)	

			Front					Back			
Cubicle	Ultra	sonic		TEV		Ultra	sonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
SCV-EX1 &											
AUX											
SCV-G1-B											
SCV-EX2 &											
AUX											
SCV-G2-B											
SCV-T1-B											

Гуре of Maintenance:	Date:	Inspected By:
		1 0

Seal Cove Substation

(YYYY-MM-DD)

St Johns Main Substation



MSF030 - SJM

Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

St Johns Main Substation Tomporature: OC Weather: Wet or Dry	Substation/Location:	Manufacturer:	Work Order Number:
Tomporetures ⁰ C Weethers Wet on Dwy	St Johns Main Substation		
Temperature: C weather: wet or Dry		Temperature:°C	Weather: Wet or Dry

Form to be completed for Partial Discharge tests using UltraTEV.

Please indicate (1) LED status color for each cubicle. (G - Green A - Amber R - Red)

	Front		Back								
Cubicle	Ultra	sonic		TEV		Ultra	sonic	sonic TEV			Comments
	G	R	G	A	R	G	R	G	A	R	
SJM-02-B											
SJM-03-B											
SJM-04-B											
SJM-06-B											
SJM-07-B											
SJM-08-B											
SJM-09-B											
SJM-11-B											
SJM-T1-B											
SJM-T2-B											
SJM-AUX											
SJM-S/S											
SJM-TB-1-2											
SJM-TB-1-3											
SJM-TIE-1-3-D											
SJM-10-B											
SJM-13-B											
SJM-14-B											
SJM-15-B											

Type of Maintenance:	Date:		Inspected By:	
		(YYYY-MM-DD)		

Stamps Lane Substation



MSF030 - SLA

Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location:	Manufacturer:	Work Order Number:				
Stamps Lane Substation						
	Temperature:°C	Weather: Wet or Dry				
Form to be completed for Partial Discharge tests using UltraTEV. Please indicate (√) LED status color for each cubicle. (G - Green A - Amber R - Red)						

Front Back Cubicle Ultrasonic TEV Ultrasonic TEV **Comments** G R G R G R G R SLA-07-B SLA-SPARE SLA-T2-B SLA-05-B SLA-03-B SLA-04-B SLA-T1-B SLA-02-B SLA-01-B SLA-06-B SLA-AUX **METERING** SLA-SPARE

Type of Maintenance:	Date:		Inspected By:	
-		(YYYY-MM-DD)	-	

Walbournes Substation



MSF030 - WAL Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location:	Manufacturer:	Work Order Number:
Walbournes Substation		
	Temperature:°C	Weather: Wet or Dry

Form to be completed for Partial Discharge tests using UltraTEV.

Please indicate (1) LED status color for each cubicle. (G - Green A - Amber R - Red)

	Front		Back								
Cubicle	Ultra	sonic		TEV		Ultra	sonic		TEV		Comments
	G	R	G	A	R	G	R	G	A	R	
WAL-SS											
WAL-05-B											
WAL-01-B											
WAL-											
INCOMING1											
WAL-02-B											
WAL-BTB-1 & 2											
WAL-03-B											
WAL-											
INCOMING2											
WAL-04-B											
WAL-06-B											
WAL-07-B											
WAL-TIE-2-3											

Walbournes Substation

Type of Maintenance:	Date:	Inspected By:	_
	(YYY)	Y-MM-DD)	



MSF031

Page 1 of 2

Maintenance Standard Report Form TRANSFORMER PROTECTION DEVICES

Substation/Location:	Work Order Number:	Transformer ID Number:
Date:	Work Performed by:	
Date.	Work I error med by.	Temperature:°C
		Weather: Wet: Dry:
ower Transformer:		
Conduits Inspected (Y/N):	Water or Corrosion(Y/N):	Remarks: (Use Reverse)
Voltage Measurement Across: (Ensure meter set to DC volts)	
Coil of Transformer Gas Trip Au		
Γrip Coil of Transformer Low V	oltage Breaker mV	
Megger Test For Gas Detector I		
Building to Device	Cabinet to Device (If Applicable)	Building to Cabinet (If Applicable)
Lead #1 to GND Ω	Lead #1 to GND Ω	Lead #1 to GND Ω
Lead #2 to GND Ω	Lead #2 to GND Ω	Lead #2 to GND $_$ Ω
Across Contacts $___$ Ω	Across Contacts $___$ Ω	
Megger Test for Winding Temp		
Building to Device	Cabinet to Device (If Applicable)	Building to Cabinet (If Applicable)
Lead #1 to GNDΩ	Lead #1 to GND Ω	Lead #1 to GND Ω
Lead #2 to GND Ω	Lead #2 to GND Ω	Lead #2 to GND $_$ Ω
Across Contacts Ω	Across Contacts Ω	
Megger Test for Oil Temp. Gau		
Building to Device	Cabinet to Device (If Applicable)	Building to Cabinet (If Applicable)
Lead #1 to GND $_$ Ω	Lead #1 to GND Ω	Lead #1 to GND Ω Lead #2 to GND Ω
Lead #2 to GND \square Ω	Lead #2 to GND Ω	Lead #2 to GND $___$ Ω
Across Contacts $___$ Ω	Across Contacts \square Ω	
Megger Test for Pressure Reliej		
Building to Device	Cabinet to Device (If Applicable)	Building to Cabinet (If Applicable)
Lead #1 to GND $_$ Ω	Lead #1 to GND $___$ Ω	Lead #1 to GND $_$ Ω
Lead #2 to GNDΩ	Lead #2 to GND Ω	Lead #2 to GND $_$ Ω
Across ContactsΩ	Across Contacts $___$ Ω	
ap Changer (If Applicabl	e):	
Megger Test For Gas Detector I	Relay: (250V for 5 min.)	
Building to Device	Cabinet to Device (If Applicable)	Building to Cabinet (If Applicable)
Lead #1 to GND $__$ Ω	Lead #1 to GND \square Ω	Lead #1 to GND Ω
Lead #2 to GND $_$ Ω	Lead #2 to GND $___$ Ω	Lead #2 to GND Ω
Lead #1 to GND Ω Lead #2 to GND Ω Across Contacts Ω	Across Contacts \square Ω	
Megger Test for Pressure Reliej		
Building to Device	Cabinet to Device (If Applicable)	Building to Cabinet (If Applicable)
	Lead #1 to GND \square Ω	Lead #1 to GND Ω
Lead #1 to GND Ω		
Lead #1 to GND Ω Lead #2 to GND Ω Across Contacts Ω	Lead #2 to GND \square Ω	Lead #2 to GND \square Ω



Maintenance Standard Report Form TRANSFORMER PROTECTION DEVICES

MSF031

Page 2 of 2

Transformer ID Number:			
Remarks:			
_			

RELAY TEST FORM

Company ID #	 I nom	 Device/Range _	
Manufacturer	 V rating	 Device/Range _	
Model	 Serial #	 Device/Range _	
Style			

Equipment	Contacts	Targets	Magnets	Settings	Taps	Connections	Calibration	Function Testing	Inputs	Checked By	Date	Comments

Codes for Contacts:	Codes for Targets:	Codes for Connections:	Codes for Calibration:	Codes for Inputs:
BC - Burnished Contacts	RT - Repaired Targets	TC - Tightened Connection	CI - Calibrate for Timing	VA - Voltage Input Incorrect
CP - Contacts Pitted			PU - Calibrate for Pick Up	IA - Current Input Incorrect
CC - Contacts Corroded	Codes for Damping Magnets:	Codes for Function Testing:	PA - Calibrate for Phase Angle	FA - Frequency Input Incorrect
CA - Contacts Adjusted	CM - Cleaned foreign Material	ST - Static Test only	CV - Calibrate for Voltage	
CR - Contacts Replaced				
RO - Removed Oxide				
Date:	<u>-</u>			
Completed by:				