

Forms

Revised: 2005-02-02

Maintenance Standard Report Form

NAMEPLATE AND DESCRIPTION

Equipment Type:		ID Number:
Substation/Location:	Manufacturer:	Serial Number:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Completed By: _____


MSF003
Form No. 8b

Maintenance Standard Report Form

BATTERIES

Revised: 2005-07-19

Location/Substation:	Manufacturer:	Work Order Number:	ID Number:
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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)	
Impedance Test Performed (Y/N)		Regular Equalizing Carried Out (Y/N)		Rack	
Results Downloaded to ProActiv?					

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	Cell No.	Volts	Specific Gravity	Cell No.	Volts	Specific Gravity	Cell No.	Volts	Specific Gravity
1			16			31			46		
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 copies of MSF018 for additional comments as required)

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



MSF004
Form No. 102

Maintenance Standard Report Form BATTERY CHARGERS

Revised: 2008-04-03

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

Complete the following. Note deficiencies and corrections in Remarks.

Type or Style/Model	_____	Equalize Voltage	_____ Volts
AC Supply Voltage (in cabinet)	_____ Volts	DC Voltage Positive-Ground	_____ Volts
AC Panel Breaker Rating	_____ Amps	DC Voltage Negative-Ground	_____ Volts
Float Voltage	_____ Volts	Current Limit Setting	_____ Amps
Float Current	_____ Amps		

Mark the appropriate block with an X

	<u>Yes</u>	<u>No</u>
Copy of Charger Manual On-Site	<input type="checkbox"/>	<input type="checkbox"/>
Breakers, Contactors, Switches and Relays Functioning Properly	<input type="checkbox"/>	<input type="checkbox"/>
Alarms Operational	<input type="checkbox"/>	<input type="checkbox"/>
Dust Cleaned From Rectifier	<input type="checkbox"/>	<input type="checkbox"/>
Ground Leakage on DC Bus	<input type="checkbox"/>	<input type="checkbox"/>
Wiring Connections Tight	<input type="checkbox"/>	<input type="checkbox"/>
Component Mounting Bolts Tight	<input type="checkbox"/>	<input type="checkbox"/>
Excessive Heat or Noise	<input type="checkbox"/>	<input type="checkbox"/>
Charger Securely Mounted	<input type="checkbox"/>	<input type="checkbox"/>
Charger Functioning Properly	<input type="checkbox"/>	<input type="checkbox"/>
Ground Test Performed	<input type="checkbox"/>	<input type="checkbox"/>

Remarks:

(attach copies of MSF018 for additional comments as required)

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


MSF005
Form No. 227

Maintenance Standard Report Form

CIRCUIT BREAKERS

Revised: 2012-07-30

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

Check each item with a \checkmark 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 Maintenance man and the Maintenance Supervisor must sign it off.

#	Type of Maint.		Task	Status or Results	Initial
	I	III			
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: Ambient Temp. (°C):	
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		
23	X	X	Megger Test Results	°C kV MΩ	
			Phase to Phase:		
			Phase to Ground:		
			Across Open Contacts:		
24	X	X	Ductor Test Results (micro-ohms)	Across Contacts Phase 1: Phase 2: Phase 3:	Bushing-Bushing
25	X	X	Motion Analyzer Test Results	Opening Velocity (ft/sec) Closing Velocity (ft/sec) Contact Wipe (In.) Stroke (In.) Contact Part Time (cycles)	

W.O. Number: _____

MSF005

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

W.O. Number: _____

MSF005

#	Type of Maint.		Task	Status or Results	Initial
	I	III			
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	Cutoff Pressure (psi): Inflation Time (sec):	
79		X	Operation Rundown (N/A for Maint. IV)	Operations before low pressure cutoff: Operations after low-pressure 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		
General					
91			Final Megger Test Results	°C	kV
			Phase to Phase:		MΩ
			Phase to Ground:		
			Across Open Contacts:		
92			Final Ductor Test Results (micro-ohms)	Phase 1: Phase 2: Phase 3:	
93			Final Motion Analyzer Test Results	Opening Velocity (ft/sec) Closing Velocity (ft/sec) Contact Wipe (In.) Stroke (In.) Contact Part Time (cycles) Reclose Time (cycles) Trip Free Time (cycles) Overtravel (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		

Remarks:

(attach copies of MSF018 as required for further remarks)

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


MSF006
Form No. 167a

Maintenance Standard Report Form

RECLOSERS

Revised: 2007-10-01

Substation/Location:	Work Order No.:	Manufacturer:	Control:	ID Number:
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Section 1: Check each item with a ✓ 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 Maintencenceman and the Maintenance Supervisor must sign it off.

#	Type of Maint.		Task	Status or Results	Initial
	I	III			
1,2,3	X	X	Maintenance History, Standards and Manufacturer's Information Reviewed		
6	X	X	ID Number Installed		
7	X	X	Nameplate Information Recorded		
8	X	X	Counter: Start Value Finish Value		
9	X	X	External Visual Inspection		
10	X	X	Check Presence of PCB; Record Level (PPM) Lab Sample Taken: Yes <input type="checkbox"/> No <input type="checkbox"/>		
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			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		

MSF006

#	Type of Maint.		Task	Status or Results	Initial		
	I	III					
44	X*		Tank Lip Painted and Bolts Sealed or Lubricated as Required				
45			Oil Filled to Correct Level				
46			Re-Check Oil Dielectric (kV)				
48	X	X	Manually Operated to Expel Air				
49			Control Cable Electrical Check				
50	X	X	Control Cable and Connector				
51	X	X	Devices and Cards Secure				
52		X	Control Accessories				
53	X	X	Quick Battery Check (N/A for Maintenance IV)				
54			Battery Discharge Test				
55	X*	X	Terminations Clean and Tight				
56	X	X	Position Indicator and Lights				
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				
61	X	X	Reclose Block Switch Reset				
62	X	X	Ammeter Sockets and Wiring				
63a	X*	X	CTs, Relays and Ammeters Numbered; Meter Operation Checked; Multiplier Labeled				
63b	X*	X	CT Ratio				
64	X*	X	Cabinet Heaters				
65	X	X	Ground Trip Switch				
66	X	X	Final Megger Test Results: 3Φ - Ground 2Φ – 1&3Φ 1Φ Cont. 2Φ Cont. 3Φ Cont.	°C	kV	MΩ	
67	X	X	Functional Check				
68	X	X	Control Settings Recorded				
69	X		Recloser at Correct Height				
70	X	X	Painting				
71	X	X	PCB Sticker Installed				
72	X	X	Risers, Disconnects and Switches (N/A for Maintenance IV)				
73	X	X	Documentation Distributed				
74	X	X	Maintenance Record Updated in Avantis				
75	X	X	Deficiencies Flagged in Avantis				

* - Required for new installation only

Section 2: Complete the following.

Recloser Settings: Operations to Lockout _____
Fast Operations _____
Time Delay Curve (Hydraulic) _____
Reclosing Interval Delays:
First _____ Second _____ Third _____
Fast Operations on Ground Trip (Hydraulic) _____
Ground Trip Plugs (Electronic): 1 _____ 2 _____
Ground Trip Mechanism (Hydraulic) set for:
Inverse _____ Definite _____ Time Delay _____

Phase Trip Plugs (Electronic): 1st _____ 2nd _____
Reset Delay Interval: _____ seconds
Minimum Trip Resistor (Electronic): Phase _____ Ground _____
Ground Trip Solenoid (Hydraulic): Series _____ Parallel _____
Overcurrent Relay Tap Block: Phase _____ Ground _____
Overcurrent Relay Time Dial: Phase _____ Ground _____
Overcurrent Relay Instantaneous: Phase _____ Ground _____
Checked Settings on all Relays _____

Enter Details of Faults Found and Corrective Actions: _____

(attach copies of MSF018 for additional comments as required)

Maint. Type: _____ Date: _____ (YYYY-MM-DD) Maintenance man: _____ Supervisor: _____

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



MSF008
Form No. 231a

Maintenance Standard Report Form

SWITCHGEAR

Revised: 2005-02-16

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

Notes: - A separate form should be used for each cubicle.
- This form does not include maintenance on the breaker. Breaker maintenance is reported on MSF005.

Check:		Mark the appropriate block with an X:	Yes	No
Bus Bars	_____	Cubicle, Bus and Insulators Cleaned	<input type="checkbox"/>	<input type="checkbox"/>
Bus Supports	_____	Air Filters Cleaned (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>
Barriers	_____	Bus Insulated as Required	<input type="checkbox"/>	<input type="checkbox"/>
Arc Chutes	_____	All Nuts and Bolts Tight	<input type="checkbox"/>	<input type="checkbox"/>
Insulators	_____	Cubicle Covers in Place	<input type="checkbox"/>	<input type="checkbox"/>
Cables and Terminations	_____	Door Operating Properly	<input type="checkbox"/>	<input type="checkbox"/>
Potheads	_____	Breaker Moves In and Out Freely	<input type="checkbox"/>	<input type="checkbox"/>
PT Carriage	_____	Ground Bus Connections Tight	<input type="checkbox"/>	<input type="checkbox"/>
Heaters, Thermostats and Vents	_____	Mechanism Lubricated	<input type="checkbox"/>	<input type="checkbox"/>
Control Switches	_____	All Relays and Meters Operating	<input type="checkbox"/>	<input type="checkbox"/>
Paint	_____	Control Wiring Connections Tight	<input type="checkbox"/>	<input type="checkbox"/>
Megger Test:		Safety Interlocks Operational	<input type="checkbox"/>	<input type="checkbox"/>
Phase to Phase	_____	CT Checks: Ratio	<input type="checkbox"/>	<input type="checkbox"/>
		Continuity	<input type="checkbox"/>	<input type="checkbox"/>
		Ground	<input type="checkbox"/>	<input type="checkbox"/>
Phase to Ground	_____	Polarity	<input type="checkbox"/>	<input type="checkbox"/>
		Roof and Doors Watertight	<input type="checkbox"/>	<input type="checkbox"/>
		Cubicle Vermin Proof	<input type="checkbox"/>	<input type="checkbox"/>
		Circuit Breaker Checked	<input type="checkbox"/>	<input type="checkbox"/>
		Automatic Shutters Operational	<input type="checkbox"/>	<input type="checkbox"/>
		Levering or Lifting Mechanism Operating Properly	<input type="checkbox"/>	<input type="checkbox"/>
		Control and Relaying Checked by Supervising Engineer – Commissioning or his Delegate	<input type="checkbox"/>	<input type="checkbox"/>

Remarks:

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



Revised: 2010-10-27

MSF009
Form No. 353

Maintenance Standard Report Form POWER TRANSFORMERS

Substation/Location:	Work Order Number:	ID Number:	
Manufacturer:	Serial Number:	Rated Voltage (kV):	KVA:

Complete the following:

Dew Point (if required): _____ °C

Oil Dielectric: _____ kV

PCB Level _____ PPM

Megger Test (in oil):

Core – Ground _____ at 250V

Two-Winding Transformers

a) H – L&G _____ at _____ V

b) L – H&G _____ at _____ V

c) H&L – G _____ at _____ V

Three-Winding Transformers

a) H – LT&G _____ at _____ V

b) L – HT&G _____ at _____ V

c) T – HL&G _____ at _____ V

d) H&L – T&G _____ at _____ V

e) H&T – L&G _____ at _____ V

f) L&T – H&G _____ at _____ V

g) HL&T – G _____ at _____ V

Weather Conditions and Temperature at Time of

Oil Testing and Meggering _____

If Tank was Open to Atmosphere:

Time Duration Open _____

Weather Conditions While Open _____

Voltage Connection _____

Megger Test Control Wiring For:

Oil Level Gauge _____ at 250V

Oil Temperature Gauge _____ at 250V

Winding Temperature Gauge _____ at 250V

Gas Detector Relay _____ at 250V

Pressure Relief Device _____ at 250V

Oil Temperature _____ °C

Oil Temperature Alarm Setting _____ °C

Oil Temperature Trip Setting _____ °C

Temperature Gauge Setting to Start Fans:

1st Stage _____ °C 2nd Stage _____ °C

Winding Temperature _____ °C

Winding Temperature Alarm Setting _____ °C

Winding Temperature Trip Setting _____ °C

Oil Level Gauge Reading _____

Mark the appropriate block with an X:

Tank Opened

Humidity Absorbent Packet Installed in Gas Detector Relay

Core Exposed to Atmosphere

Spill Pan Free of Oil

Vacuum Pulled

Oil Sample Obtained for Gas Analyses

Tank Ground Connections Tight

Evidence of Oil Leakage

Lubricant Applied to Off-Load Tapchanger Handle

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 Inspection Completed

All Junction Boxes Inspected

Oil Added

Pressure Relief Device on Transformer

If So, Operation Indicator and Alarm Switch Required Resetting

Internal Inspection of Transformer Made

If So, Complete Remainder of This Section

Loose or Damaged Parts

Tools or Debris Found

Explosion Vent Lower Diaphragm Intact

Main Tank Oil-Level Gauge Checked

Spray Nozzles Installed

Bushing Leads in Good Condition

CT Leads and Control Wiring Good and in Place

Tapchanger Leads Good and Connections Tight

All Nuts and Bolts in Place and Tight

Core Laminations and Supports in Place

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 Properly Mounted

Coils and Insulation in Good Condition

Bottom of Tank Free From Debris or Loose Parts

Any Sign of Moisture

Cracks in Tank Wall, Especially in Welding

Yes No

☐ ☐
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Damage Marks on Tank Wall

Links Checked for Proper Connections and Tightness

MSF009

10/10

Check if Okay:

Physical Condition	_____
Paint	_____
Bushings	_____
Lightning Arresters	_____
Bushing Oil Level	_____

Line Connections _____
 Alarms Operational _____
 Gaskets _____
 Control Wiring Terminal Connections _____
 Control Cabinet _____

Cabinet Heaters _____
Breather _____
Silica Gel _____
Fans _____
Foundation _____

Ratio Test:

Tap Position	H1 Phase	H2 Phase	H3 Phase	Tap Position	H1 Phase	H2 Phase	H3 Phase
	H1 - ____ ____ - ____	H2 - ____ ____ - ____	H3 - ____ ____ - ____		H1 - ____ ____ - ____	H2 - ____ ____ - ____	H3 - ____ ____ - ____
1				18			
2				19			
3				20			
4				21			
5				22			
6				23			
7				24			
8				25			
9				26			
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17							

Remarks:

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MSF009

Type of Maintenance _____ Date _____ Inspected By _____

Maintenance Standard Report Form

TAPCHANGERS

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

Type of Maintenance _____ **Date** _____ **Inspected By** _____

Maintenance Standard Report Form

POTENTIAL TRANSFORMERS

Revised: 2005-09-13

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 3 for 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 Maintenance man and the Maintenance Supervisor must sign it off.

#	Type of Maint.		Task	Status or Results	Initial
	I	III			
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*	<div style="display: flex; justify-content: space-between;"> <div>Megger Test Results:</div> <div> <div>°C</div> <div>kV</div> <div>MΩ</div> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>H-Ground:</div> <div></div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>L-Ground:</div> <div></div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>H-Low:</div> <div></div> </div>		
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			<div style="display: flex; justify-content: space-between;"> <div>Final Megger Test:</div> <div> <div>°C</div> <div>kV</div> <div>MΩ</div> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>H-Ground:</div> <div></div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>L-Ground:</div> <div></div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>H-Low:</div> <div></div> </div>		
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 at _____ kV		
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		

MSF011

*** Only if unit can be taken out of service.**

Section 2: Record primary voltage injection ratio test for installation check:

Section 2: Record primary voltage injection ratio test for installation check:					
Secondary Winding	Tap Connection	Nameplate Ratio	Voltage Applied H1-H2	Voltage Measured	Ratio
X					
Y					

Remarks: _____

Maint. Type: _____ Date: _____ (YYYY-MM-DD) Maintenanceman: _____ Supervisor: _____

MSF011

(attach copies of MSF018 as Required for Further Remarks)

Maint. Type: ____ Date: _____ (YYYY-MM-DD) Maintenanceman: _____ Supervisor: _____


MSF012
Form No. 230b

Maintenance Standard Report Form

VOLTAGE REGULATORS

Revised: 2005-09-13

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

Check each item with \checkmark 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 (MΩ):		
			Megger Voltage (Volts):		
			Insulation Temperature ($^{\circ}$C):		
15	X*		Regulator Tank Removed		
16	X*		Internal Components Cleaned		
17	X		Internal Inspection		
18	X		Windings and Control Wiring		
19	X		All Contacts OK		
20	X		Nuts and Connections Tight		
21	X		Visual of Contact Operation		
22	X		Drive Mechanism OK		
23	X		Position Indicator Assembly		
24	X	X	Neutral Position Indicators		
25	X		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 (MΩ):		
			Megger Voltage (Volts):		
			Insulation Temperature ($^{\circ}$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		

Transformer Ohmmeter Test:

PT Internal Tap Position	PT Control Panel Tap Position	Nameplate Ratio _____ : 1	Measured PT Ratio _____ Volts	Calculated PT Ratio _____ : 1
		CT Nameplate Ratio _____ : 1	Measured CT Ratio _____ Amps	Calculated Ratio _____ : 1

(Attach copies of MSF018 for additional comments as required)

Maint. Type	Date	Maintenanceman	Supervisor
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Maintenance Standard Report Form

CURRENT TRANSFORMERS

Revised: 2005-09-13

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

#	Task	Status or Results	Initial
1	ID Number Installed (N/A for Maintenance III)		
2	Nameplate Information Recorded (N/A for Maintenance III)		
3	External Visual Inspection		
4	Primary Bushings Cleaned*		
5	Painting as Required*		
6	PCB Level Checked; Label Installed (PPM)		
7	Unit Properly Grounded, Securely Mounted		
8	Check Oil Level Gauge (If Applicable)		
9	Megger Test Results*	Primary-GND:	
		Secondary-GND:	
		Ratio:	
10	Ratio Continuity Checked*		
11	Ratio Checked On All Taps*		
12	Polarity Checked (N/A for Maintenance III)		
13	Secondary Current Checked		
14	Check for Abnormal Noise (N/A for Maintenance I)		
17	Avantis Updated		
18	Documentation Distributed		

Remarks:This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

Maint. Type: _____ Date: _____ (YYYY-MM-DD) Maintenanceman: _____ Supervisor: _____

Revised: 2005-02-16

Maintenance Standard Report Form
POWER CABLES AND ACCESSORIES

Substation/Location:	Work Order Number:	Line Voltage:	ID Number:
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Single Phase ☐ or Three Phase ☐

Megger Test:

Phase to Ground

Phase to Phase

Oil Filled Cables:

Reservoir Pressures

Ambient Temperature _____ °C

Alarm Settings: High Low

Mark the appropriate block with an X:

	<u>Yes</u>	<u>No</u>
Trench/Ducts Clean and Free From Defects	<input type="checkbox"/>	<input type="checkbox"/>
Any Sign of Arcing or Tracking	<input type="checkbox"/>	<input type="checkbox"/>
Cables and Potheads Properly Grounded and/or Insulated	<input type="checkbox"/>	<input type="checkbox"/>
Evidence of Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>
Evidence of Compound Leaks	<input type="checkbox"/>	<input type="checkbox"/>
Primary Connections Clean and Tight	<input type="checkbox"/>	<input type="checkbox"/>
Grounding Connections Complete and Tight	<input type="checkbox"/>	<input type="checkbox"/>
Any Sign of Deterioration or Damage	<input type="checkbox"/>	<input type="checkbox"/>
Pothead Bushings in Good Condition	<input type="checkbox"/>	<input type="checkbox"/>
Cables Adequately Supported	<input type="checkbox"/>	<input type="checkbox"/>

Remarks:This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

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

(YYYY-MM-DD)

MSF015
Form No. 362

Maintenance Standard Report Form

MISCELLANEOUS EQUIPMENT

Revised: 2005-02-16

Substation/Location:	Division:
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Mark the appropriate blocks with an X to indicate the equipment covered by this report:

	<u>Yes</u>	<u>No</u>		<u>Yes</u>	<u>No</u>		<u>Yes</u>	<u>No</u>
Structure	<input type="checkbox"/>	<input type="checkbox"/>	Metering Tank	<input type="checkbox"/>	<input type="checkbox"/>	Yard	<input type="checkbox"/>	<input type="checkbox"/>
Buswork	<input type="checkbox"/>	<input type="checkbox"/>	Company Number _____			Station Service Transformer	<input type="checkbox"/>	<input type="checkbox"/>
Insulators	<input type="checkbox"/>	<input type="checkbox"/>	Foundations	<input type="checkbox"/>	<input type="checkbox"/>	AC and DC Distribution	<input type="checkbox"/>	<input type="checkbox"/>
Yard Lighting	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	Other	<input type="checkbox"/>	<input type="checkbox"/>
Lightning Arresters	<input type="checkbox"/>	<input type="checkbox"/>	Control Cables	<input type="checkbox"/>	<input type="checkbox"/>	Specify _____		
ID Number _____			Control Building	<input type="checkbox"/>	<input type="checkbox"/>			

Mark the appropriate block with an X:

Structures:

	<u>Yes</u>	<u>No</u>
All Nuts and Bolts in Place and Tight	<input type="checkbox"/>	<input type="checkbox"/>
Sufficient Back-Filling Around Footings	<input type="checkbox"/>	<input type="checkbox"/>
Structure Solid and True	<input type="checkbox"/>	<input type="checkbox"/>
Paint Condition Good	<input type="checkbox"/>	<input type="checkbox"/>
Crossarms in Good Condition	<input type="checkbox"/>	<input type="checkbox"/>

Buswork:

Ample Phase-to-Phase & Phase-to-GND Clearances	<input type="checkbox"/>	<input type="checkbox"/>
Bus Securely Supported	<input type="checkbox"/>	<input type="checkbox"/>
Insulators Good and Clean	<input type="checkbox"/>	<input type="checkbox"/>
Dissimilar Metals Used	<input type="checkbox"/>	<input type="checkbox"/>
All Nuts and Bolts in Place and Tight	<input type="checkbox"/>	<input type="checkbox"/>

Insulators:

Any Sign of Contamination or Flashover	<input type="checkbox"/>	<input type="checkbox"/>
Any Cracked or Broken Porcelain	<input type="checkbox"/>	<input type="checkbox"/>
All Pins in Place	<input type="checkbox"/>	<input type="checkbox"/>

Lightning Arresters:

Securely Mounted	<input type="checkbox"/>	<input type="checkbox"/>
Any Broken or Cracked Porcelain	<input type="checkbox"/>	<input type="checkbox"/>
Line and Ground Connections Tight	<input type="checkbox"/>	<input type="checkbox"/>
Cement in Flanges in Good Condition	<input type="checkbox"/>	<input type="checkbox"/>

Metering Tank:

Securely Mounted	<input type="checkbox"/>	<input type="checkbox"/>
Vent Plug Removed	<input type="checkbox"/>	<input type="checkbox"/>
Primary and Secondary Connections Tight	<input type="checkbox"/>	<input type="checkbox"/>
Any Sign of Oil Leakage	<input type="checkbox"/>	<input type="checkbox"/>
Bushings in Good Condition	<input type="checkbox"/>	<input type="checkbox"/>
Paint Condition Good	<input type="checkbox"/>	<input type="checkbox"/>
Tank Properly Grounded	<input type="checkbox"/>	<input type="checkbox"/>

Yard Lighting:

	<u>Yes</u>	<u>No</u>
Fixtures Securely Mounted	<input type="checkbox"/>	<input type="checkbox"/>
All Lights Operating Properly	<input type="checkbox"/>	<input type="checkbox"/>
Lenses and Enclosures in Good Condition	<input type="checkbox"/>	<input type="checkbox"/>

Foundations:

Level	<input type="checkbox"/>	<input type="checkbox"/>
Any Sign of Breakage or Moving	<input type="checkbox"/>	<input type="checkbox"/>

Station Service Transformer:

Any Sign of Oil Leakage	<input type="checkbox"/>	<input type="checkbox"/>
Bushings in Good Condition	<input type="checkbox"/>	<input type="checkbox"/>
Paint Condition Good	<input type="checkbox"/>	<input type="checkbox"/>
Tank Properly Grounded	<input type="checkbox"/>	<input type="checkbox"/>
Secondary Leads Enter Bushing Terminal	<input type="checkbox"/>	<input type="checkbox"/>
Connectors at the Top (if outside)		
Oil Dielectric _____ kV (if requested)		

Grounding:

Any Damaged or Broken Wire	<input type="checkbox"/>	<input type="checkbox"/>
Grounding Done as per Current Practices	<input type="checkbox"/>	<input type="checkbox"/>
All Equipment Grounded as Required	<input type="checkbox"/>	<input type="checkbox"/>
All Connections Tight	<input type="checkbox"/>	<input type="checkbox"/>

Control Cables:

In Place and Properly Protected	<input type="checkbox"/>	<input type="checkbox"/>
Connections Tight	<input type="checkbox"/>	<input type="checkbox"/>
Any Sign of Corrosion at Terminals	<input type="checkbox"/>	<input type="checkbox"/>

AC and DC Distribution:

Panels Mounted Securely	<input type="checkbox"/>	<input type="checkbox"/>
Breakers Installed Correctly	<input type="checkbox"/>	<input type="checkbox"/>
Wiring Connections Tight	<input type="checkbox"/>	<input type="checkbox"/>
Cables/Conduits Properly Connected/Supported	<input type="checkbox"/>	<input type="checkbox"/>
Current Loading Within Panel Rating	<input type="checkbox"/>	<input type="checkbox"/>
Any Sign of Corrosion on Breaker Terminals	<input type="checkbox"/>	<input type="checkbox"/>
Any Sign of Overheating	<input type="checkbox"/>	<input type="checkbox"/>
Battery Charger and/or Other Such Essential Equipment on Separate Breaker	<input type="checkbox"/>	<input type="checkbox"/>


MSF016
Form No. 167b

Maintenance Standard Report Form NU-LEC RECLOSERS

Revised: 2011-05-24

Substation/Location:	Work Order No.:	Manufacturer:	Control:	ID Number:
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Check each item with a \checkmark 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 Maintenceman 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 \rightarrow Finish Value \rightarrow		
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: \rightarrow 3 Φ - Ground 2 Φ - 1&3 Φ 1 Φ Cont. 2 Φ Cont. 3 Φ Cont.	$^{\circ}\text{C}$ kV M Ω 	
15	Ductor Test Results (micro-ohms): \rightarrow Circle whether ductored via lead or bushing	Phase 1 Phase 2 Phase 3	
16	Check Sharepoint For Latest File Versions		
17	Ensure Proper Computer Software Version Installed		
18	Record Existing Firmware \rightarrow		
18	Load and Record Latest Firmware \rightarrow		
19	Load EMC Test Settings File for Testing		
20	Load IOEX File; Record File Name \rightarrow		
21	Load DNP3 File; Record File Name \rightarrow		
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 \rightarrow		
33	Contact Life Check; Record Values (Φ A, Φ B, Φ C) \rightarrow		

Maintenance Type: _____ Date: _____ (YYYY-MM-DD) Maintenceman: _____ Supervisor: _____

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 Details of Faults Found and Corrective Actions: _____

(add copies of MSF018 for additional comments as required)

Maint. Type: _____ Date _____ (YYYY-MM-DD) Maintenanceman _____ Supervisor _____



MSF017
Form No.

Maintenance Standard Report Form
BATTERY DISCHARGE

Revised: 2005-02-16

Substation/Location:	Manufacturer:	Work Order Number:	ID Number:
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Time:							
Start O/C Volts:							
Bank Load Volts:							
Load Current:							
Discharge Time:							
Electrolyte Temp.:							
Pilot Cell SPG:							

Cell #	SPG at Start	Volts at Specified Time Interval					
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
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39							

Date: _____ (YYYY-MM-DD)	Completed By: _____
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MSF017

[illegible][illegible]



MSF018

Maintenance Standard Report Form

GENERAL COMMENTS

Revised: 2005-02-16

Work Order No.:	ID Number:
------------------------	-------------------

This image shows a full page of blank white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for writing or drawing. There are no margins, text, or other markings present.

Date: _____
(YYYY-MM-DD)

Completed By: _____

MSF018



BOA™ Breaker Oil Analysis

Oil Circuit Breaker

Sample Data



H₂b
ANALYTICAL SERVICES
INCORPORATED

RETURN CONTAINERS TO: Phone: _____ Fax: _____	REPORT & INVOICE TO: Glenn Samms Newfoundland Power Box 8910, 55 Kenmount Road St. John's, NF A1B 3P6 Phone: (709) 737-5702 Fax: (709) 737-2926	REPORT TO: Phone: _____ Fax: _____
--	--	---

P.O. # _____ **Sampled By:** _____

Sample Location (Substation/PH/PP)	Notes:		
Equipment / Company Number			
Serial Number (Nameplate)			
Manufacturer (Nameplate)			
Date of Manufacture (Nameplate)			
Model Number /Type (Nameplate)			
Voltage Rating (Nameplate)			
Fluid Volume (Nameplate)			
Pole (Tank) <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	Tank No. 1	Tank No. 2	Tank No. 3
Phase	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
Interrupting Rating (KA) (KVA) (MVA)			
Amp Rating			
Present Counter Reading			
Oil Temperature			
No. of switching operations since last internal inspection			
Number of fault operations since last internal inspection			
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:	<input type="checkbox"/> Routine	<input type="checkbox"/> Routine	<input type="checkbox"/> Routine
Lab Use Only			

All Tests below are Required for BOA Diagnostics <input type="checkbox"/> Dissolved Gas Analysis (D-3612) <input type="checkbox"/> Particle Counts <input type="checkbox"/> Moisture in Oil (D-1533B) <input type="checkbox"/> Dielectric Breakdown (D-1816) <input type="checkbox"/> Interfacial Tension (D-971) <input type="checkbox"/> Acid Number (D-974) <input type="checkbox"/> Color (D-1500)	Optional Tests <input type="checkbox"/> PCB (EPA-8080) <input type="checkbox"/> Metals (D-3635 ICP) <input type="checkbox"/> Microscopy <input type="checkbox"/> 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
 T2E 7A2

Phone (403) 282 8542
Fax (403) 282 8593



BOA™ Breaker Oil Analysis Oil Circuit Breaker Sample Data



H₂b

ANALYTICAL SERVICES
INCORPORATED

☐ Routine Test

☐ Retest

☐ This is a Return to Service Test

**Send Samples to: TJH2b Analytical Services Canada Inc.
Bay #1, 2835-19 Street NE
Calgary, AB
T2E 7A2**

**Phone (403) 282 8542
Fax (403) 282 8593**

TCA™ Transformer Condition Assessment

Transformer Fluid

Sample Data



RETURN CONTAINERS TO: Phone: _____ Fax: _____	REPORT & INVOICE TO: Glenn Samms Newfoundland Power Box 8910, 55 Kenmount Road St. John's, NF A1B 3P6 Phone: (709) 737-5702 Fax: (709) 737-2926	REPORT TO: Phone: _____ Fax: _____
--	--	---

P.O. # _____ **Sampled By:** _____

Sample Location	(Substation/PH/PP)			
Equipment Number				
Bank and Phase				
Serial Number	(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	(Nameplate)			
Oil Filtered/Unit Serviced	(Yes/No)			
Reason for test				
Winding Temperature				
Top Oil Temperature				

Sample Date			
Syringe No.			
Bottle No.			
Status:			
Lab Use Only			

All Tests below are Required for TCA Diagnostics

- | | |
|--|--|
| <input type="checkbox"/> Dissolved Gas Analysis (D-3612) | <input type="checkbox"/> Interfacial Tension (D-971) |
| <input type="checkbox"/> Particle Profile | <input type="checkbox"/> Color (D-1500) |
| <input type="checkbox"/> Moisture in Oil (D-1533B) | <input type="checkbox"/> Power Factor (D-924) |
| <input type="checkbox"/> Dielectric Breakdown (D-1816) | <input type="checkbox"/> Oxidation Inhibitor |
| <input type="checkbox"/> Acid Number (D-974) | <input type="checkbox"/> Furfurals |

Instructions: All DGA samples are taken using a glass syringe or stainless steel cylinder. All oil quality test samples are taken using a 1 qt plastic bottle. Flush one gallon of oil through the drain valve prior to collecting samples.

☐ Routine Test ☐ Retest ☐ This is a Return to Service Test

Send Samples to: TJH2b Analytical Services Canada Inc.
Bay #1, 2835-19 Street NE
Calgary, AB
T2E 7A2

Phone (403) 282 8542
Fax (403) 282 8593

TASA™ Tapchanger Activity Signature Analysis LTC Fluid Sample Data


H₂b

ANALYTICAL SERVICES
INCORPORATED

RETURN CONTAINERS TO: Phone: _____ Fax: _____	REPORT & INVOICE TO: Glenn Samms Newfoundland Power Box 8910, 55 Kenmount Road St. John's, NF A1B 3P6 Phone: (709) 737-5702 Fax: (709) 737-2926	REPORT TO: Phone: _____ Fax: _____
--	--	---

P.O. # _____ Sampled By: _____

Sample Location	(Substation/PH/PP)			
Equipment Number				
Bank and Phase				
Serial Number	(Nameplate)			
Manufacturer	(Nameplate)			
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 Tests below are Required for TASA Diagnostics

- | | |
|--|--|
| <input type="checkbox"/> Dissolved Gas Analysis (D-3612) | <input type="checkbox"/> Acid Number (D-974) |
| <input type="checkbox"/> Particle Profile | <input type="checkbox"/> Interfacial Tension (D-971) |
| <input type="checkbox"/> Moisture in Oil (D-1533B) | <input type="checkbox"/> Color (D-1500) |
| <input type="checkbox"/> Dielectric Breakdown (D-1816) | |

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

☐ Routine Test ☐ Retest ☐ This is a Return to Service Test

Send Samples to: TJH2b Analytical Services Canada Inc.
Bay #1, 2835-19 Street NE
Calgary, AB
T2E 7A2

Phone (403) 282 8542
Fax (403) 282 8593

ALPH-10 POWER FACTOR INSULATION TEST "TWO WINDING TRANSFORMERS"											
APPARATUS INFORMATION								MEGGER LIMITED TYPE: 01-A10 TWO WINDING XFRMS			
DATE: _____ / _____ / _____ (MM/DD/YY) COMPANY: _____ TRANSFORMER LOCATION: _____ DESIGNATION: _____								ENVIRONMENT			
TRANSFORMER NAME PLATE DATA								WEATHER: _____ AIR TEMP: _____ °C OIL TEMP: _____ °C WINDING TEMP: _____ °C REL. HUMIDITY: _____ %			
MFGR: _____ S/N: _____ YEAR: _____ TYPE: _____ KVA _____ FORM: _____ HIGH SIDE KV: _____ Y _____ Δ _____ LOW SIDE KV: _____ Y _____ Δ _____											
TEST NO.	TEST CONNECTIONS			Menu Select	EQUIVALENT 10KV TEST RESULTS						Insulation Rating
	H.V.	CxRED			Voltage (V)	Current (mA)	Power (mW)	Power Factor (%)		CAP. (pf)	
								Measured	Correct to 20°C		
1	High	Low		1R[G+B]							
2	High	Low		5G[R+B]							
*3	High	Low		6R+G[B]							
**4	High	Low		1R[G+B]							
5	Low	High		5G[R+B]							
6	Low	High		6R+G[B]							
* Compare the Capacitance and Watts readings of this test to the sum of the Capacitance and Watts readings for Test No's 1+2+4. Ideally they should be the same. ** Compare the results of this test with the results of Test No. 1. Ideally they should be the same. *** Compare the Capacitance and Watts readings of this test against the sum of the Capacitance and Watts readings for Test No's 5&6. Ideally they should be the same.											
OIL RESULTS:											
DIELECTRIC STRENGTH TEST				INSULATION POWER FACTOR							
STD USED: 1816 <input type="checkbox"/> 877 <input type="checkbox"/>				TEST RESULTS							
AVG. BREAKDOWN	STD. DEV.	VOLTAGE (KV)	CURRENT (mA)	Power (mW)	Power Factor %		CAP. (pf)	Insulation Rating			
					Measured	Corr to 20°C					
REASON FOR TESTING:				OIL CELL S.N.							
WORK ORDER NO:				ALPH-10 S/N:							
TESTED BY:				LAST DATE TESTED: _____ / _____ / _____ (MM/DD/YY)							
CHECKED BY:				DATE CHECKED: _____ / _____ / _____ (MM/DD/YY)							
COMPANY:											
DEPARTMENT:				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				

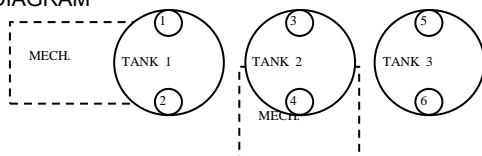
CIRCUIT BREAKER OVERALL TESTS

TEST NO.	CB	INSULATION TESTED	ϕ	TEST MODE	TEST CONNECTIONS BUSHINGS				TEST KV	CAPACITANCE C(PF)	% POWER FACTOR			10KV		2.5KV		INSULATION RATING
					ENG	GND	GAR	UST			MEASUREMENT	20°C %PF	CORR FCTR	mA	watts	mA	watts	
1	OPEN	C _{1G}		GST GND	1													
2		C _{2G}		GST GND	2													
3		C _{3G}		GST GND	3													
4		C _{4G}		GST GND	4													
5		C _{5G}		GST GND	5													
6		C _{6G}		GST GND	6													
7	CLOSED	C _{1G} + C _{2G}		GST GND	1&2													
8		C _{3G} + C _{4G}		GST GND	3&4													
9		C _{5G} + C _{6G}		GST GND	5&6													

BUSHING & OIL TESTS

TEST NO.	BUSHING		ϕ															
	NO.	SER. NO.																
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														

DIAGRAM



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)

REMARKS;

INSULATION RATING KEY

G = GOOD
D = DETERIORATED
I = INVESTIGATE
B = BAD (REMOVE OR RECONDITION)

INSULATION TESTED

1 TO 6 = BUSHING TERMINALS
G = GROUND

TANK LOSS INDEX

TANK 1 = $W_7 - (W_1 + W_2) =$
TANK 2 = $W_8 - (W_3 + W_4) =$
TANK 3 = $W_9 - (W_5 + W_6) =$

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

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

TWO WINDING TRANSFORMER

Capacitance and Power Factor Tests

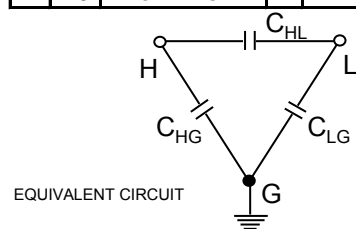
COMPANY				DATE			
TEST LOCATION				TESTED BY			
XFMR IDENT.				TEST SET NO.			
XFMR SERIAL NO.				AIR TEMPERATURE			
XFMR MFR. TYPE KVA				OIL TEMPERATURE			
HIGH KV SGL <input type="checkbox"/> Y <input type="checkbox"/> Δ <input type="checkbox"/>				% RH			
HIGH KV BUSH				WEATHER			
LOW KV SGL <input type="checkbox"/> Y <input type="checkbox"/> Δ <input type="checkbox"/>				TERTIARY KV SGL <input type="checkbox"/> Y <input type="checkbox"/> Δ <input type="checkbox"/>			
LOW KV BUSH				TERTIARY BUSH			

TRANSFORMER OVERALL TESTS

TEST #	INSULATION TESTED	TEST MODE	TEST CONNECTIONS (WINDINGS)				TEST KV	CAPACITANCE C(PF)	% POWER FACTOR			EQUIV. 10KV		EQUIV. 2.5KV		INSULATION RATING
			ENG	GND	GAR	UST			MEASURED	20°C %PF	CORRECTED	Ma	WATTS	Ma	WATTS	
1	$C_{HG} + C_{HL}$	GST GND	H	L												
2	C_{HG}	GST	H		L											
3	C_{HL}	UST	H			L										
4	C_{HL}	<>	TEST 1 MINUS TEST 2				<>									
5	$C_{LG} + C_{HL}$	GST GND	L	H												
6	C_{LG}	GST	L		H											
7	C_{HL}	UST	L			H										
8	C_{HL}	<>	TEST 5 MINUS TEST 6				<>									
9	$C_{HG'}$	<>	C_{HG} MINUS HIGH BUSH.				<>									
10	$C_{LG'}$	<>	C_{LG} MINUS HIGH BUSH.				<>									

BUSHING TESTS

TEST #	BUSHING		UST													
	SER. NO.	φ														
HI KV	11	A	UST													
	12	B	UST													
	13	C	UST													
	14	N	UST													
LO KV	15	A	UST													
	16	B	UST													
	17	C	UST													
	18	N	UST													
19	OIL TEST		UST													



EQUIVALENT CIRCUIT

INSULATION RATING KEY

G = GOOD
D = DETERIORATED
I = INVESTIGATE
B = BAD (REMOVE OR RECONDITION)

REMARKS

H = HIGH - VOLTAGE WINDING

L = LOW - VOLTAGE WINDING

G = GROUND

N = NEUTRAL BUSHING

NOTE: SHORT EACH WINDING ON ITSELF

letter in ENG column = winding energized.

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

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

THREE 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 <input type="checkbox"/> Y <input type="checkbox"/> Δ <input type="checkbox"/>				% RH			
HIGH KV BUSH				WEATHER			
LOW KV SGL <input type="checkbox"/> Y <input type="checkbox"/> Δ <input type="checkbox"/>				TERTIARY KV SGL <input type="checkbox"/> Y <input type="checkbox"/> Δ <input type="checkbox"/>			
LOW KV BUSH				TERTIARY BUSH			

TRANSFORMER OVERALL TESTS

TEST #	INSULATION TESTED	TEST MODE	TEST CONNECTIONS (WINDINGS)				TEST KV	CAPACITANCE C(PF)	% POWER FACTOR			EQUIV. 10KV		EQUIV. 2.5KV		INSULATION RATING
			ENG	GND	GAR	UST			MEASURED	20°C %PF	CORRECTED	Ma	WATTS	Ma	WATTS	
1	$C_{HG} + C_{HL}$	GST	H	L	T											
2	C_{HG}	GST	H		L&T											
3	C_{HL}	UST	H	T		L										
4	C_{HL}	<>	TEST 1 minus TEST 2				<>									
5	$C_{LG} + C_{LT}$	GST	L	T	H											
6	C_{LG}	GST	L		T&H											
7	C_{LT}	UST	L	H		T										
8	C_{LT}	<>	TEST 5 minus TEST 6				<>									
9	$C_{TG} + C_{HT}$	GST	T	H	L											
10	C_{TG}	GST	T		H&L											
11	C_{HT}	UST	T	L		H										
12	C_{HT}	<>	TEST 9 minus TEST 10				<>									
13	C_{HG}'	<>	C_{HG} minus HIGH BUSH.				<>									
14	C_{LG}'	<>	C_{LG} minus LOW BUSH.				<>									
15	C_{TG}'	<>	C_{TG} minus TERTIARY BUSH.				<>									

BUSHING TESTS

TEST #	BUSHING																
	SER. NO.	φ	UST														
HI KV	16	A	UST														
	17	B	UST														
	18	C	UST														
	19	N	UST														
LO KV	20	A	UST														
	21	B	UST														
	22	C	UST														
	23	N	UST														
T KV	24	A	UST														
	25	B	UST														
	26	C	UST														
	27	N	UST														
28	OIL TEST		UST														

INSULATION RATING KEY

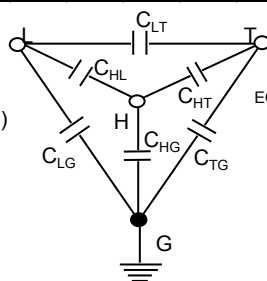
G = GOOD
D = DETERIORATED
I = INVESTIGATE
B = BAD (REMOVE OR RECONDITION)

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

AVO INTERNATIONAL

P.O. Box 9007

Valley Forge, PA 19484-9007



REMARKS

EQUIVALENT CIRCUIT

H = HIGH - VOLTAGE WINDING

L = LOW - VOLTAGE WINDING

G = GROUND

N = NEUTRAL BUSHING

NOTE: SHORT EACH WINDING ON ITSELF

Letter in ENG column = winding energized.

PLEASE MAKE ANY COMMENTS OR REMARKS ON THE REVERSE OF THIS FORM
SEND COMPLETED FORM TO SYSTEM CONTROL CENTER SUPERINTENDANT



MSF027
Revised 2011-02-08

Maintenance Standard Report Form VOLTAGE TRANSDUCER CHECK FORM

SUBSTATION: _____ EQUIP MONITORED: _____ TRANSDUCER SERIAL No: _____

NOTE: Please review test procedure MST018 before completing this form

1. AC VOLTAGE MEASUREMENT (Range: 110 to 125 Volts, 1 Decimal Place X.X):

AC VOLTAGE (Vin)

2. DC VOLTAGE MEASUREMENT/CALCULATION (Range: 0 to 5 Volts, 3 decimal places, X.XXX):

VDC meas	VDC calc	% ERROR

3. SCADA VOLTAGE READING (Ask SCADA Tech. to force poll RTU or Gateway to refresh readings):

RESULTS

4. a) PANEL METER VOLTAGE READING:

RESULTS

4. b) RELAY VOLTAGE READING:

RESULTS

Required Equations:

Voltage Transducer Full Scale: **150 VAC in = 1 mA or 5 VDC across RTU point**

Calculated VDC out: **$VDC_{calc} = (V_{in}/150)*5$**

Measured VDC out: **Step 2**

Calculated VDC out should equal measured VDC out across transducer or RTU input

Percent Error Calculation: **$\% \text{ Error} = (VDC_{meas} - VDC_{calc}) / VDC_{calc} * 100$**

NOTE: If % Error is 1% or less, then transducer is ok

Signature: _____

Date Completed: _____

SCC operator and/or SCADA Technician: _____

- 1. PLEASE MAKE ANY COMMENTS OR REMARKS ON THE REVERSE OF THIS FORM**
- 2. COMPLETED FORM TO BE SCANNED AND FORWARDED TO PLANNER**
- 3. PLANNER WILL ENTER A WORK REQUEST TO OPERATIONAL SUPPORT FOR ADDITIONAL INVESTIGATION IF THE TRANSDUCER PASSED THE TEST**


MSF028
Revised 2011-03-29

Maintenance Standard Report Form

POWER TRANSDUCER CHECK FORM

SUBSTATION: _____ EQUIP MONITORED: _____ TRANSDUCER SERIAL No: _____

NOTE: Please review test procedure MST019 before completing this form

1. a) AC VOLTAGE MEASUREMENTS (Range: 110 to 125 Volts, 1 Decimal Place X.X):

AC VOLTAGE VALUE		
Phase A	Phase C	V Avg

1. b) AC CURRENT MEASUREMENTS (Range: 0 to 5 Amps, 3 Decimal Places X.XXX):

AC CURRENT VALUE			
Phase A	Phase B	Phase C	I Avg

2. DC VOLTAGE MEASUREMENT/CALCULATION (Range: 0 to 5 Volts, 3 Decimal Places X.XXX):

TRANSDUCER VDC OUTPUTS		
Output Watt (VDCw)	Output VAR (VDCv)	VDCt

3. SCADA POWER READINGS (Ask SCADA Tech. to force poll RTU or Gateway to refresh readings):

MW	MVAR

4. CALCULATIONS:

VA Expected (VAlc)	VA Measured (VAm)	% Error

5. a) PANEL METER READINGS:

MVA	MVA Multiplier

5. b) RELAY READINGS:

3 Phase MW	3 Phase MVAR

Required Equations:

Expected VDC out of transducer: $VDCt = \sqrt{(VDCw)^2 + (VDCv)^2}$

Percent Error: $\%Error = (VAm - VAlc) / VAlc * 100$

NOTE: If % Error is 5% or less, then transducer is ok

Expected VA input: $VAlc = (VDCt * 1500) / 5$

Measured VA input: $VAm = 3 * Vavg * Iavg$

Signature: _____

Date Completed: _____

SCC Operator and/or SCADA Technician: _____

1. PLEASE MAKE ANY COMMENTS OR REMARKS ON THE REVERSE OF THIS FORM
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



MSF029
Revised 5-30-2006

Padmount Information Form

Company Number: _____

Serial Number: _____

Manufacturer: _____

Manufacture Date: _____

Old Company No.: _____
(If Applicable)

Rating (kVA): _____

Weight (kg): _____

Oil Capacity (litres): _____

Primary Voltage (kV): _____

Secondary Voltage (kV): _____

Primary Connections:

Elbows

☐

Open Lugs

☐

Primary Configuration:

Delta

☐

Wye

☐

Single Phase

☐

PCB Level (PPM): _____

Lab Tested

☐

Clor-N-Oil

☐

White Label

☐

Tests:

Dielectric Oil

Pass

☐

Fail

☐

Ratio

☐
☐

Megger

☐
☐

Notes:

Tested By: _____

Date: _____

Keyed in Avantis: ☐

Kings Bridge Substation



MSF030 - KBR
Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location: Kings Bridge Substation	Manufacturer: Temperature: _____ °C	Work Order Number: 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)

Cubicle	Front					Back					Comments
	Ultrasonic		TEV			Ultrasonic		TEV			
	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)



MSF030

Maintenance Standard Report Form

METERING TANKS

Revised: 2009-06-23

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		
25	<div style="display: flex; justify-content: space-between;"> <div>Final Megger Test Results:</div> <div>°C</div> <div>kV</div> <div>MΩ</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>3φ - Ground</div> <div></div> <div></div> <div></div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>2φ-1&3φ</div> <div></div> <div></div> <div></div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>PT HV-LV</div> <div></div> <div></div> <div></div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>CT HV-LV</div> <div></div> <div></div> <div></div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>PT LV-Ground</div> <div></div> <div></div> <div></div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>CT LV-Ground</div> <div></div> <div></div> <div></div> </div>		
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		

PT Ratio Test Results: Test Method					
	Result	Initial		Result	Initial
H1A/H0 – V1A/V2A			*H1B/H0 – V1B/V2B		
H1C/H0 – V1C/V2C					

Enter details of faults found and corrective actions:

(attach copies of MSF018 for additional comments as required)

Maint. Type: _____ Date: _____ (YYYY-MM-DD) Maintenanceman: _____ Supervisor: _____

Memorial Substation



MSF030 - MUN
Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location: Memorial Substation	Manufacturer: Temperature: _____ °C	Work Order Number: 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)

Cubicle	Front					Back					Comments
	Ultrasonic		TEV			Ultrasonic		TEV			
	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											

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

Ridge Road Substation



MSF030 - RRD
Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location: Ridge Road Substation	Manufacturer: Temperature: _____ °C	Work Order Number: 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)

Cubicle	Front					Back					Comments
	Ultrasonic		TEV			Ultrasonic		TEV			
	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)

Seal Cove Substation

(YYYY-MM-DD)

St Johns Main Substation



MSF030 - SJM
Revised: 2006/12/08

Maintenance Standard Report Form

SWITCHGEAR PARTIAL DISCHARGE TESTING

Substation/Location: St Johns Main Substation	Manufacturer: Temperature: _____ °C	Work Order Number: 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)

Cubicle	Front					Back					Comments
	Ultrasonic		TEV			Ultrasonic		TEV			
	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)

Walbournes Substation

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



Revised: 2010-10-27

Maintenance Standard Report Form

TRANSFORMER PROTECTION DEVICES

MSF031

Page 1 of 2

Substation/Location:	Work Order Number:	Transformer ID Number:
Date:	Work Performed by:	Temperature: _____ °C Weather: Wet: <input type="checkbox"/> Dry: <input type="checkbox"/>

Power 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 Aux. Relay _____ mV

Trip Coil of Transformer Low Voltage Breaker _____ mV

Megger Test For Gas Detector Relay: (250V for 5 min.)

Building to Device	Cabinet to Device (If Applicable)
Lead #1 to GND _____ Ω	Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω	Lead #2 to GND _____ Ω
Across Contacts _____ Ω	Across Contacts _____ Ω

Building to Cabinet (If Applicable)
Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω

Megger Test for Winding Temp. Gauge: (250V for 1 min.)

Building to Device	Cabinet to Device (If Applicable)
Lead #1 to GND _____ Ω	Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω	Lead #2 to GND _____ Ω
Across Contacts _____ Ω	Across Contacts _____ Ω

Building to Cabinet (If Applicable)
Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω

Megger Test for Oil Temp. Gauge: (250V for 1 min.)

Building to Device	Cabinet to Device (If Applicable)
Lead #1 to GND _____ Ω	Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω	Lead #2 to GND _____ Ω
Across Contacts _____ Ω	Across Contacts _____ Ω

Building to Cabinet (If Applicable)
Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω

Megger Test for Pressure Relief Device: (250V for 1 min.)

Building to Device	Cabinet to Device (If Applicable)
Lead #1 to GND _____ Ω	Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω	Lead #2 to GND _____ Ω
Across Contacts _____ Ω	Across Contacts _____ Ω

Building to Cabinet (If Applicable)
Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω

Tap Changer (If Applicable):

Megger Test For Gas Detector Relay: (250V for 5 min.)

Building to Device	Cabinet to Device (If Applicable)
Lead #1 to GND _____ Ω	Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω	Lead #2 to GND _____ Ω
Across Contacts _____ Ω	Across Contacts _____ Ω

Building to Cabinet (If Applicable)
Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω

Megger Test for Pressure Relief Device: (250V for 1 min.)

Building to Device	Cabinet to Device (If Applicable)
Lead #1 to GND _____ Ω	Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω	Lead #2 to GND _____ Ω
Across Contacts _____ Ω	Across Contacts _____ Ω

Building to Cabinet (If Applicable)
Lead #1 to GND _____ Ω
Lead #2 to GND _____ Ω

All Wiring Returned to Original Termination Points (Y/N): _____

Maintenance Standard Report Form

TRANSFORMER PROTECTION DEVICES

Page 2 of 2

Transformer ID Number: _____

Remarks:

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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:

BC - Burnished Contacts
 CP - Contacts Pitted
 CC - Contacts Corroded
 CA - Contacts Adjusted
 CR - Contacts Replaced
 RO - Removed Oxide

Codes for Targets:

RT - Repaired Targets

Codes for Damping Magnets:

CM - Cleaned foreign Material

Codes for Connections:

TC - Tightened Connection

Codes for Function Testing:

ST - Static Test only

Codes for Calibration:

CI - Calibrate for Timing
 PU - Calibrate for Pick Up
 PA - Calibrate for Phase Angle
 CV - Calibrate for Voltage

Codes for Inputs:

VA - Voltage Input Incorrect
 IA - Current Input Incorrect
 FA - Frequency Input Incorrect

Date: _____

Completed by: _____