

1 **Q. Please provide general descriptions and program cycles of Newfoundland Power's**
 2 **inspection programs for:**

3 **a. Transmission (include sub-transmission) lines**

4 **b. Terminal stations**

5 **c. Distribution substations distribution feeders.**

6
 7 **A. A. Transmission**

8 Attachment A to this response provides the current version of Newfoundland Power's
 9 *Transmission Inspection and Maintenance Practices*. All Company transmission lines
 10 are required to have a minimum of 1 detailed ground inspection per year. More frequent
 11 inspections may be required on some lines depending upon their operating performance.¹

12
 13 **B. Substations²**

14 All substations are inspected 8 times annually alternating between *long* and *short*
 15 inspections.³ Each substation has a customized inspection form for both long and short
 16 inspections. Attachment B to this response provides examples of both the long and short
 17 substation inspection forms.⁴

18
 19 **C. Distribution Feeders**

20 Attachment C to this response provides the current version of the Company's
 21 *Distribution Inspection and Maintenance Practices*. All Newfoundland Power
 22 distribution lines are inspected on a 7-year cycle. Vegetation is inspected as part of the 7-
 23 year cycle and again mid-cycle as vegetation growth rates dictate more frequent
 24 inspection.

¹ A comprehensive review of transmission line maintenance was provided in the response to Request for Information PUB-NP-061 of the 2014 investigation into *Supply Issues and Power Outages on the Island Interconnected System*.

² Newfoundland Power does not use the term *terminal station* for any of its substations. All Company stations that include transformation and switching equipment for transmission, generation and distribution purposes are referred to as *substations*.

³ A long inspection is a detailed inspection that covers all major equipment in the substation and includes a checklist for each piece of equipment that is covered. A short inspection is primarily intended as a means to check equipment integrity (such as oil leaks) and to ensure that no employee or public safety hazards are present in the substation.

⁴ Detailed substation maintenance standards and inspection forms were provided in the response to Request for Information PUB-NP-064 of the 2014 investigation into *Supply Issues and Power Outages on the Island Interconnected System*.

Transmission Inspection and Maintenance Practices



TRANSMISSION INSPECTION AND MAINTENANCE PRACTICES

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TRANSMISSION INSPECTION AND MAINTENANCE PRACTICES

Policy Statement

Regularly scheduled inspections and correction of identified deficiencies shall be undertaken on all transmission lines to provide for safe and reliable operation. Regional Directors are responsible to ensure that transmission line inspection and maintenance activities are completed in accordance with this policy. Responsibility for maintaining and revising this policy rests with the Manager responsible for Transmission.

All preventative and corrective maintenance activities shall be recorded in the Company's computerized Transmission Asset Management System (TAMS).

Public and Employee Safety

Newfoundland Power owns and operates in excess of 2,000 km of transmission lines that transverse both rural and urban environments. Transmission line corridors may be used as trailways for snowmobilers, ATV operators, skiers, hikers and others and are also regularly used by employees to carry out inspection and maintenance activities. As well, in urban areas, lines often travel along streets and through residential neighbourhoods. Because transmission line corridors are used by the public and employees, lines and right-of-ways must be inspected and maintained in a safe manner.

Regular inspections of transmission lines and timely correction of identified deficiencies will minimize risk to the public and employees. Transmission line inspectors have the responsibility to inspect lines thoroughly with a keen focus on identifying potential public and employee hazards. Regional Directors, Area and Regional Managers of Operations, and Line-Supervisors have the shared responsibility to ensure that inspections are completed and any identified deficiencies and hazards are corrected in accordance with this policy.

Inspector Qualifications

As a minimum, an inspector must have the following qualifications to complete the Detailed Ground Inspections on Newfoundland Power's transmission lines:

- i) Minimum 3 years of experience in the electrical utility industry, in the operations or engineering area.
- ii) Familiarity with the operation, maintenance and construction of transmission lines.
- iii) Familiarity with the use and operation of off-road vehicles such as ATV's and snowmobiles.
- iv) Basic understanding of the electrical and mechanical nature of transmission lines.
- v) Successful completion of Newfoundland Power line inspection workshop "Line Inspection Fundamentals".

The above qualifications can be obtained by a combination of on-the-job training, formal education and training as provided by recognized educational institutions, and internal Company training and workshops.

In order to maintain status as a Newfoundland Power line inspector, the inspector must successfully complete in-house line inspector training every three years.

Typically, all inspections will be carried out by the Planner assigned to the respective area.

Transmission Asset Management System (TAMS)

All transmission line preventive maintenance and inspections as well as deficiency identification and corrective maintenance activities shall be recorded in the Company's computerized maintenance management system known as Transmission Asset Management System (TAMS). The inspections and deficiencies are to be recorded in the field, by inspectors on handheld devices. Data from these devices shall be downloaded regularly into the computer system.

The Transmission department is responsible for administering TAMS and information services for training users. Planners, Supervisors, Line Supervisors, Managers, and others within the Transmission group may have access to this system.

Inspection Type and Frequency

All transmission lines are required to have a minimum of one (1) Detailed Ground Inspection per year. More frequent inspections or patrols may be required on some lines depending on their operating performance and as determined by the Area or Regional Manager of Operations.

Generally, Climbing Inspections shall only be performed on transmission structures/lines to:

- a) More thoroughly assess concerns with specific components (i.e. insulators, hardware, crossarms) as identified by ground inspections
- b) Ensure a newly constructed line meets construction standards (acceptance inspection).

Regularly scheduled Helicopter Patrols are not required under this policy. Special circumstances and operational problems can arise that will warrant a helicopter patrol (i.e. frequent line trips, storm damage, etc). A patrol performed under these conditions shall not substitute for a ground inspection.

Detailed Ground Inspections

During detailed ground inspections of transmission lines, inspectors will inspect all poles, towers, conductors, insulators, crossarms, crossbraces, anchors, guys, deadends, jumpers, sleeves and other hardware, as well as the right-of-way, and identify deficiencies that require correction.

To provide for a thorough inspection of poles, anchors, and guys at the groundline, at least one (1) of every four (4) ground inspections shall be carried out with no snow cover present.

Personnel performing inspections shall use binoculars, plumb bob, hammer, core sampler, screw driver, crescent wrench, digital camera, height measurement meter and all other equipment deemed necessary to assist in the evaluation of transmission line components.

In some cases it will be necessary for inspectors to utilize off-road capable vehicles such as ATVs, snowmobiles, or Argos. When such vehicles are required, additional considerations will be necessary. If the vehicle used is equipped with an enclosed cab, it is required that the vehicle be equipped with an escape hatch operable from both inside and outside the vehicle. Should water bodies need to be crossed, floater survival suits are required equipment as well.

Any line or site specific hazards or details should be identified by the inspectors on a go-forward basis and noted in handheld device. This information should be consulted before beginning any line inspections to confirm any extra requirements that inspectors should be aware of prior to commencing work, and to communicate any site considerations to contractors who may be working on the lines. Any additional details should be identified by the inspectors on a go-forward basis and noted in handheld device.

When working on "Remote" transmission lines, extra safety equipment and precautions are necessary. Inspectors should have in their possession the following items:

- Appropriately stocked survival kit
- GPS device including most recent mapping software
- Personal flotation devices (PFDs) if use of off road vehicles in water is required

- Redundant transportation such as a second ATV, snowmobile, or Argo; to be used in the case of incapacitation of primary mode of transportation
- At least one satellite phone for use in areas with poor cellular coverage

Inspectors are also required to complete and document tailboard discussions on a daily basis, and more often as needed to address changing conditions and newly identified hazards. Ground conditions and communications limitations should be considered as part of the discussion.

Appropriate operations manual procedures must be followed. Relevant procedures include the following:

- OPR112.08 – “Off Road Vehicles”
- OPR112.16 – “Driving Off Road Vehicles”
- OPR101.16 – “Working Alone or in Isolated Locations”
- OPR101.17 – “Traveling and Working in Remote Areas”
- OPR300.01 – “Risk Management/Job Planning”
- OPR300.03 – “Working Alone”
- OPR112.07 – “Travelling Over Wetlands and/or Bogs”
- OPR106.46 – “Power Line De-Energization and Hold-Off Protection”
- OPR106.47 – “Transmission Line Structures with Damaged Insulators”
- OPR106.48 – “Transmission Line Structures with Damaged Equipment or Hardware other than Damaged Insulators”

Results of detailed ground inspections and identified deficiencies shall be recorded in the field on handheld devices. GPS co-ordinates are to be taken in the field for all structures, approved access trails and hazards.

Transmission Line Component Inspection Guidelines

Transmission line ground inspections require evaluation of the following components. For each component there are guidelines to follow during inspections. These guidelines do not cover all possible deficiencies that may exist on each component, and reasonable judgement must be used by the Planner in identifying and prioritizing deficiencies.

a) Wood Poles

Ensure all ‘nameplate’/structure list information such as structure number, type, etc. is recorded and correct. Collect GPS co-ordinate of pole if required.

Inspect and test wood pole(s) to determine condition at and above the groundline as per the following section - Detailed Wood Pole Inspections.

Ensure pole is properly backfilled and not undermined.

Check poles for any vibrations and indications that conductors are vibrating excessively.

Where applicable, inspect condition of crib timbers. Ensure crib is properly rock filled.

Check structure for plumbness or any degree of misalignment.

Check for structure number tags.

Check rock mounts for damage or deterioration.

b) Crossarms and crossbraces

Inspect the wood crossarms/crossbraces for the following:

- Rotting
- Damage due to burning
- Splitting or Cracking
- Any deformation due to twisting or bending

c) Crib

Inspect and test the crib for the following:

- Proper rock filling
- Rotting/damaged timbers
- Missing timbers

d) Steel Pole Structures

Inspect pole for mechanical damage and corrosion.

Check for plumbness.

Check for number tags. Ensure pole is properly backfilled and not undermined.

Check that steel pole climbing pegs are not installed to at least the 4m height location.

Check structure grounding across section joints.

e) Steel Towers

Inspect tower for damaged or missing members.

Check member connections for loose or missing nuts and bolts.

Check members for buckling.

Inspect tower for corrosion

Check tower for plumbness and any degree of misalignment.

Check for structure number tags.

Inspect backfill conditions around tower footings and legs. Check footing for deterioration. Check vegetation around footing.

Check anchor bolts for cracks, rusting or missing nuts.

Check tower for missing or damaged Danger Signs. Ensure that signs are clearly visible.

Check condition of anti-climbing barriers. Anti-climbing barriers and warning signs should be installed on all steel towers.

f) Guys

Inspect guys and preformed grips for wear, breaks, slackness, and corrosion.

Ensure guy guards are secure and are installed on every guy wire. Install additional guy guards where deep snow or drifts are encountered or expected to cover existing guy guards.

Ensure guys are grounded where required.

Ensure guy insulators are properly installed

g) Anchors

Inspect anchor rod and backfill conditions.

Check for anchor rod damage or deterioration.

Ensure anchor is not undermined or pulling.

Ensure preformed grip is completely visible and anchor eye is above ground level.

Check for any abandoned anchor rods that are protruding above ground and may pose a hazard.

h) Insulators

Inspect for broken, cracked, chipped, misaligned, or flashed insulators. Check non-deadend insulators for uplift. Check post insulator studs for backing off and looseness.

If suspension insulators are $\geq 50\%$ damaged the inspector shall stay clear of the structure in question and take pictures from a distance. These deficiencies should be called in to the Transmission/Distribution Maintenance Supervisor immediately, prioritized as Emergency and brought to the attention of the Area Operations Superintendent. The determination may be made at this time to place the line in Hold-Off immediately as per OPR116.02.

i) Hardware

Check hardware for missing nuts, bolts, cotter pins, and loose, worn, bent or corroded hardware.

Check ball link eye bolts for visible wear in the link connection

FleXall-type saddle clamps have been known to wear at the clevis bolt eventually causing conductor damage or failure. Inspect all FleXall type clamps using binoculars or a spotting scope, to determine the amount of visible wear at the clevis bolt and saddle ears.

j) Conductors & Accessories

Inspect conductor sag. All three conductors should appear to have the same sag. Check for excessive sag that could result in phases slapping together.

Inspect conductors for proper clearances from buildings, roads, ground, other power/communication lines. Use height measurement device to determine conductor height above ground where clearance may not be adequate.

Inspect conductor for broken or frayed strands, bird-caging, burn marks, foreign objects.

Inspect deadend assemblies and splices for any abnormal condition.

Inspect vibration dampers and anti-galloping devices for wear and positioning.

Where required, inspect for damaged or missing conductor warning markers.

k) Ground Wires

Inspect condition of overhead ground wire for corrosion and broken strands.

Inspect structure ground wire. Ensure it is rigidly supported and has not been cut, and that ground wire guard is in place.

Check for tightness and corrosion.

l) Group Operated Disconnect Switches

Check locks and locking mechanism are intact and secure. Check switch for signs of tampering. Gang-operated switches in areas readily accessible to the public are required to be double-locked.

Inspect switch handle, pipe, etc. for damage and proper alignment.

Inspect all ground connections for tightness, corrosion and damage.

Ensure switches are properly labeled.

Check switch blades are in fully open or closed position as per its normal configuration.

Inspect insulators for damage.

Ensure ground mat has not been disturbed.

Check for missing or damaged danger signs. Ensure that signs are clearly visible.

Where switch yards exist, check for damage or deterioration of the fence. Also check to ensure gate is closed and locked, that that fence is adequately grounded and danger signs are in good condition. Check vegetation inside yard.

m) In Line Switches

Ensure blades are in fully open or closed position and locked open for normally open switches.

Check insulators for deterioration or damage.

Check whips for damage and proper alignment.

n) Right of Way

To assign a priority to the vegetation deficiency, the inspector must take into consideration the details of the vegetation growth, as well as the following

- Public and employee safety
- The criticality of the line (radial or loop, number and type of customers, load, etc.)
- The physical location of the line (populated or remote area, near existing roadways or cross-country, etc.)
- The anticipated growth rate (depending on the type of vegetation)

Check condition of vegetation growth along right-of-way.

When recording a brush clearing vegetation deficiency, be sure to record information on the type of brush to be cleared (deciduous or coniferous), the density of brush to be cleared (Light, Medium, Heavy), the average height of the brush, and the start and end points of the section on line requiring brush clearing.

Check for danger trees that may contact the conductor or trees close to the line that can be easily climbed.

Check for tree stumps or cut off pole stumps that could pose a hazard for snowmobiles and ATV's.

Check for encroachments by foreign structures, unauthorized excavation or fill areas, etc.

Any clotheslines or other customer owned attachments on transmission line structures should be removed by the Planner during the inspection.

Detailed Wood Pole Inspections and Testing

The following inspection and testing procedures shall be used to determine the integrity of transmission line wood poles.

Visual Inspection

Inspect the condition of the pole from the groundline to the top on all quadrants. The pole shall be examined for the following defects: pole top rot, ground line rot, external decay, rotting, deterioration, splits, checks, cracks, breaks, burns or other fire damage, woodpecker damage, signs of insect infestation, and plumbness

During each transmission line inspection, all wood poles in service shall require a detailed Visual Inspection.

Sounding Test

Using a flat faced hammer, sound the pole surface at regular intervals on all quadrants from the groundline to 2 m above grade. Care should be taken to detect any difference in sound. When the sound does differ, (i.e. hollow sound) it may indicate internal decay and further testing may be required. This test can be used to evaluate any portion of the pole above groundline.

Sounding Tests shall be randomly done on poles in service 35 years or less.

Poles in service more than 35 years require a Sounding Test during each inspection.

Core Sampling Test

This test is performed using an approved core sampling device. By drilling through the centerline of the pole a core sample can be extracted for evaluation. The location of bore holes shall be determined by the sounding test. All bore holes should be plugged with a tight fitting, treated wooden plug. Also, to avoid transfer of decay, the core sampler must be cleaned with an approved fungicide.

If the visual inspection and/or the sounding test indicate a problem, a Core Sampling Test can be performed to aid in the evaluation of the pole.

Deficiency Prioritization and Correction

Where practical, inspectors shall correct deficiencies on site during a transmission line inspection. The inspector shall carry the required materials to complete the repair.

- Replace or reattach a missing guy guard.
- Tighten a loose pre-form connection or slack guy.
- Replace or reattach a missing ground cover.
- Add staples to an unsecured ground wire or ground cover.
- Replace or reattach a sign, equipment/structure label, or lock.

The Planner shall assign a Maintenance Priority for each major deficiency identified during an inspection which will quantify the seriousness of the deficiency and establish when corrective action is required. All non-Emergency deficiencies are to be priority ranked as TD1, TD2 or TD4 and entered into TAMS via a hand held device.

The correction of deficiencies shall be completed in the time frame outlined below:

CLASSIFICATION OF PRIORITY	RESPONSE
Emergency Immediate security of the line is at risk or serious safety hazard exists.	Immediate
TD1 Deficiencies that are a serious hazard or would result in an interruption if not corrected within 7 days.	Within 7 days
TD2 Deficiencies that are a less serious hazard or would result in an interruption if not corrected within 1 month.	Within 1 month
TD4 Deficiencies that are not a safety hazard which should be corrected as part of the capital plan for the following year	In the following capital year

The shared responsibility for scheduling maintenance rests with the Planner and Line Supervisor.

If the Planner notes a deficiency that is considered to be an Emergency, he shall immediately notify the area Manager.

If a deficiency is noted to be a TD1 or TD2 priority, it is the Planner's responsibility to ensure the appropriate personnel is aware of the work and of the high priority nature of the work.

A TD1 priority will permit time for formulating a plan of action to correct the deficiency. Planning should begin immediately to ensure corrective action is taken as quickly as possible after the identification of the deficiency.

Regional Managers / Supervisors will ensure corrective maintenance work is complete, in the time frames outlined above, to prevent failure from occurring.

While it is not possible to cover all conditions that a Planner may encounter, the general guidelines found in Appendix A can be used to assist in the classification of defects. In practice, the Planner will assign priority based on his knowledge and experience.

APPENDIX A

GENERAL GUIDELINES FOR CLASSIFICATION OF PRIORITY

ITEM	EMERGENCY	TD1	TD2	TD4
Poles	Broken/severe undermining	Serious cracks or deterioration/unauthorized attachment		Serious checks or splits/woodpecker holes/decay
Crossarms	Broken	Serious cracks or deterioration		Significant rot
Crossbrace			Significant deterioration or broken cross brace	Less significant cracks or deterioration
Cribs				Significant damage or deterioration of the crib timber or loss of rock
Leaning Structures	Line clearance in question or high risk of falling over	Leaning over 2m		Leaning between 0.5m – 1m
Steel Towers		Significant damage/deterioration to support structure or members. Missing or significant deterioration or damage to signs or anti-climbing barrier		Deterioration to support structure or members. Minor deterioration or damage to signs or anti-climbing barriers
Guy / Guy Guards Preform Grips	Broken or disconnected on angle or deadend structure	Buried or severely corroded on angle or deadend structure. Missing guy guard (TD1 or TD2 depending on location, time of year)		Broken, buried, disconnected or severely corroded on other structures. Missing ground attachment. Slack guys.
Anchors / Rod	Rod cut off or undermined on angle/deadend struc.	Rod severely corroded or pulling out on angle/deadend structure		Rod cut or anchor pulling out on other structure types or buried on any structure
Suspension Insulator	50% or more defective in string or cracked/broken rod in composite insulator			Less than 50% defective in string or damage/rod exposed in composite insulator
Pintype / Linepost Insulators	50% or more of the skirts are chipped, cracked or otherwise damaged, or insulator is floating	< 50% of the skirts are chipped, cracked or otherwise damaged Very loose insulator stud		Minor defects – chipped, misaligned Loose insulator stud
Hardware		Missing or Damaged/Worn: High risk of causing interruption	Missing or Damaged/Worn: Moderate risk of causing interruption	Missing or Damaged/Worn: Low risk of causing interruption
Ball Link Eye Bolts			Visible wear in link, >50% worn	Visible wear in link, <50% worn
Conductor Saddle Clamps			FleXall type, extreme wear in clevis bolt	FleXall type, moderate wear in clevis bolt

ITEM	EMERGENCY	TD1	TD2	TD4
Conductor Damage	Sag causing public safety hazard	More than ¼ strands broken		Bird caging. 1 or 2 strands broken
Vibration Dampers				Failed or broken
Overhead Groundwire	Broken and/or severe clearance problem with conductor		Frayed or broken strands	Slack with minor clearance problem
Structure Grounding	Unsupported grounding in danger of contacting conductor	Section missing or cut		Section unsupported-no clearance problem
Group Operated Disconnect Switch	Lock/locking mechanism removed/damaged. Missing or significant deterioration or damage to signs. Missing or significant deterioration to ground connections or ground mats. Blades that are not fully opened or closed. Significant damage to insulators		Moderate damage or deterioration to insulators/handle or other hardware.	Less serious damage or deterioration to infrastructure or signs
In Line Switches	Blades not fully engaged or not fully open. Significant damage to insulators			Less serious damage or deterioration of insulators, blades, hardware or another part of the switch
Corrosion (any component)		Severe cases		
Encroachments	Active operations with clearance concerns (public safety hazard) and/or high risk of causing interruption (Emergency or TD1)		Non-active operations with clearance problem	Other encroachments on r-o-w
Danger Trees		Substantially leaning and high risk of falling and hitting line: TD1 or TD2 depending on situation		Trees within easement that may contact line when felled
High Trees/Brush	Burnt trees close to line and trees that would pose hazard to person climbing tree. Energized trees.			Trees close to line with no evidence of burning and pose no immediate hazard if climbed.

Substation Inspection Forms

Substation Mobile Web Application Inspection Forms

Print Back

001906 Hardwoods
April, 2019

Page 1 of 4
MSF002
Form No. 139



Maintenance Standard Report Form
Routine Substation Inspection

Revised: 2018-07-26

Sub: 001906 Hardwoods Inspection Type: SUBSTATION INSPECTION (GROUP 5)	W.O. Number:
	Completed By:
	Date Completed:

Mark X in appropriate block. Enter measurements as required.
Enter unmultiplied values unless otherwise asked.

General Properties	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
*Special Instructions Completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AC Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AC Panel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Building Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cabinet Signage (Arc Flash)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cable Trench Covers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crushed Stone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Danger and Caution Tags	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DC Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DC Panel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drainage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Eye Wash Station	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fence and Fence Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fence Barb Wire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fire Extinguisher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
First Aid Kit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Flashlight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gates and Locks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ground Sticks and/or Hot Sticks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High Voltage Danger Signs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	NL Hydro Key On Site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outside Signage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Risks to System Reliability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Snow Clearing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spare Power Fuses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Station Service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telephone and Directory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Toilet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vandalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yard Clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yard Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

General Metering

HWD-12.5KV-S/S

Meter Number: _____ 227 Multiplier: _____ 1.00
 KWH: unmultiplied reading _____ Multiplier Correct?

MVA: unmultiplied reading _____

HWD-25KV-S/S

Meter Number: _____ 701031 Multiplier: _____
 KWH: unmultiplied reading _____ Multiplier Correct?

MVA: unmultiplied reading _____

Substation Mobile Web Application Inspection Forms

HWD-T1

Meter Number: _____ Multiplier: 28800.00
KWH: unmultiplied reading _____ MWH: unmultiplied reading _____

HWD-T2

Meter Number: 1 356 705 Multiplier: 28800.00
KWH: unmultiplied reading _____ Multiplier Correct?
MWH: unmultiplied reading _____

HWD-03-B

210869 - CB-Vacuum Sat Unsat N/A C/C Sat Unsat N/A C/C
Grounding Physical Condition

HWD-19L-B

210117 - CB-Bulk Oil Sat Unsat N/A C/C Sat Unsat N/A C/C
Counter _____ Max Amps Phase A _____
Max Amps Phase B _____ Max Amps Phase C _____

HWD-49L-B

210202 - CB-Bulk Oil Sat Unsat N/A C/C Sat Unsat N/A C/C
Counter _____ Max Amps Phase A _____
Max Amps Phase B _____ Max Amps Phase C _____

HWD-54L-B

210706 - CB-SF6 Sat Unsat N/A C/C Sat Unsat N/A C/C
Breaker Position Local Remote Breaker Status Closed Open
 Cabinet Heater
Cabinet Light Conduits
Counter _____ Equipment Identification
Foundation Gas Pressure
Gas Pressure _____ Gas Pressure - Phase A _____
Gas Pressure - Phase B _____ Gas Pressure - Phase C _____
Grounding Hinges / Hasps / Latches and Handles
Lubrication Max Amps Phase A _____
Max Amps Phase B _____ Max Amps Phase C _____
Physical Condition Springs Charged

HWD-5L-B

210203 - CB-Bulk Oil Sat Unsat N/A C/C Sat Unsat N/A C/C
Counter _____ Max Amps Phase A _____
Max Amps Phase B _____ Max Amps Phase C _____

HWD-72L-B

210571 - CB-SF6 Sat Unsat N/A C/C Sat Unsat N/A C/C
Air Pressure _____ Counter _____
Gas Pressure - Phase A _____ Gas Pressure - Phase B _____
Gas Pressure - Phase C _____ Max Amps Phase A _____
Max Amps Phase B _____ Max Amps Phase C _____

Substation Mobile Web Application - Inspection Forms

HWD-79L-B

210185 - CB-Bulk Oil

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Counter _____ Max Amps Phase A _____
 Max Amps Phase B _____ Max Amps Phase C _____

HWD-CHG-E

110258 - Charger

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Charger Current A _____ Equalize Voltage V _____
 Equip. Current A _____ Float Voltage V _____

HWD-T1

200271 - Power Xfmr-TC

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Max Oil Temp _____ Max Winding Temp _____

HWD-T1-B

210122 - CB-Bulk Oil

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Counter _____ Max Amps Phase A _____
 Max Amps Phase B _____ Max Amps Phase C _____

HWD-T2

200236 - Power Xfmr-TC

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Max Oil Temp _____ Max Winding Temp _____

HWD-T2-B

210123 - CB-Bulk Oil

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Counter _____ Max Amps Phase A _____
 Max Amps Phase B _____ Max Amps Phase C _____

Special Instructions:

Description	Date Complete	Notes
1. Please record all types, sizes and condition of SPARE POWER FUSES found in Substations where applicable on spreadsheet provided. This to include Power Xfmr, PTs and SS Fuses. Forward info to Electrical Maintenance Planners indicating the associated Substation.	2018-12-06	

Substation Mobile Web Application - Inspection Forms

Remarks / Details of Work Completed :

Page 4 of 4

<u>Follow Up Work :</u>	<u>Suggested Priority :</u>
(1) _____	1 2 3 4 5 6
(2) _____	1 2 3 4 5 6
(3) _____	1 2 3 4 5 6
(4) _____	1 2 3 4 5 6
(5) _____	1 2 3 4 5 6
(6) _____	1 2 3 4 5 6
(7) _____	1 2 3 4 5 6
(8) _____	1 2 3 4 5 6

Priority Key :
 1 - Immediate (2 days) 2 - High (1 week) 3 - Medium (1 mth)
 4 - Low (3 mths) 5 - Project 6 - Deficiency (>3 mths)

Inspected By : Employee # : Hours : Date Completed :

Supervisor Name : Reviewed Date :

Work Order Number :

Work Order Keyed :

Substation Mobile Web Application - Inspection Forms

Print Back

001906 Hardwoods
April, 2019

MSF002
Form No. 139



Maintenance Standard Report Form
Routine Substation Inspection

Revised: 2018-07-26

Sub: 001906 Hardwoods Inspection Type: SUBSTATION INSPECTION	W.O. Number:
	Completed By:
	Date Completed:

Mark X in appropriate block. Enter measurements as required.
Enter unmultiplied values unless otherwise asked.

General Properties	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
*Special Instructions Completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AC Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AC Panel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Building Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cabinet Signage (Arc Flash)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cable Trench Covers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crushed Stone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Danger and Caution Tags	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DC Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DC Panel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drainage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Eye Wash Station	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fence and Fence Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fence Barb Wire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fire Extinguisher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
First Aid Kit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Flashlight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gates and Locks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ground Sticks and/or Hot Sticks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High Voltage Danger Signs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	NL Hydro Key On Site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outside Signage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Risks to System Reliability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Snow Clearing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spare Power Fuses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Station Service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telephone and Directory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Toilet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vandalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yard Clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yard Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Miscellaneous Equipment	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
Lightning Arrestors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Potential Transformers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potheads and Cables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Switch Blades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

General Metering
HWD Buildings (2)

Meter Number:	_____	Multiplier:	_____
KVA: unmultiplied reading	_____	KWH: unmultiplied reading	_____
Multiplier Correct?	<input type="checkbox"/>	MVA: unmultiplied reading	_____

Substation Mobile Web Application - Inspection Forms

HWD-12.5KV-S/S

Meter Number: _____ 227 Multiplier: _____ 1.00
 KWH: unmultiplied reading _____ Multiplier Correct?
 MVA: unmultiplied reading _____

HWD-12.5KV-S/S-2

Meter Number: _____ 223835 Multiplier: _____ 1.00
 KWH: unmultiplied reading _____ Multiplier Correct?
 MVA: unmultiplied reading _____

HWD-25KV-S/S

Meter Number: _____ 701031 Multiplier: _____
 KWH: unmultiplied reading _____ Multiplier Correct?
 MVA: unmultiplied reading _____

HWD-T1-DB

Meter Number: _____ Multiplier: _____
 MVA: unmultiplied reading _____

HWD-01-B

210103 - CB-Bulk Oil

Breaker Position	Sat	Unsat	N/A	C/C	Breaker Status	Sat	Unsat	N/A	C/C
	Local				Closed				
	Remote				Open				
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counter	_____				Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	House Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Oil Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCB Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tank Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HWD-02-B

210102 - CB-Bulk Oil

Breaker Position	Sat	Unsat	N/A	C/C	Breaker Status	Sat	Unsat	N/A	C/C
	Local				Closed				
	Remote				Open				
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counter	_____				Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	House Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Oil Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCB Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tank Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HWD-03-B

210869 - CB-Vacuum

Breaker Position	Sat	Unsat	N/A	C/C	Breaker Status	Sat	Unsat	N/A	C/C
	Local				Closed				
	Remote				Open				
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cabinet Light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conduits					Counter	_____			

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	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Cubicle Heater	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Equipment Identification	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Foundation	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Grounding	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Hinges / Hasps / Latches and Handles	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	House Heater	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Max Amps Phase A	_____	Max Amps Phase B	_____
Max Amps Phase C	_____	Physical Condition	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Springs Charged	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		

HWD-04-B

210669 - CB-SF6

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
Breaker Position	Local				Breaker Status	Closed			
	Remote					Open			
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cabinet Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cabinet Light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counter	_____				Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lubrication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HWD-06-B

210101 - CB-Bulk Oil

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
Breaker Position	Local				Breaker Status	Closed			
	Remote					Open			
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counter	_____				Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	House Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Oil Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCB Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tank Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HWD-07-B

210642 - CB-SF6

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
Breaker Position	Local				Breaker Status	Closed			
	Remote					Open			
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cabinet Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cabinet Light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counter	_____				Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

HWD-07-R2

Substation Mobile Web Application - Inspection Forms

230657 - RECLOSER T&B

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Control Panel Alarms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Counter	_____			
Foundations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Instantaneous Amps Phase A	_____				Instantaneous Amps Phase B	_____			
Instantaneous Amps Phase C	_____				Peak Mthly Demand KW	_____			
Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

HWD-08-B

210641 - CB-SF6

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Breaker Position	Local				Breaker Status	Closed				
	Remote					Open				
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cabinet Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cabinet Light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Counter	_____				Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

HWD-08-R2

230659 - RECLOSER T&B

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Control Panel Alarms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Counter	_____			
Foundations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Instantaneous Amps Phase A	_____				Instantaneous Amps Phase B	_____			
Instantaneous Amps Phase C	_____				Peak Mthly Demand KW	_____			
Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

HWD-09-R4

230722 - RECLOSER G&W

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Control Panel Alarms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Counter	_____			
Foundations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Instantaneous Amps Phase A	_____				Instantaneous Amps Phase B	_____			
Instantaneous Amps Phase C	_____				Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HWD-19L-B

210117 - CB-Bulk Oil

Sat Unsat N/A C/C

Sat Unsat N/A C/C

Breaker Position	Local				Breaker Status	Closed				
	Remote					Open				
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cabinet Light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Counter	_____				
Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
House Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max Amps Phase A	_____				
Max Amps Phase B	_____				Max Amps Phase C	_____				
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Oil Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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PCB Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relay Targets and Indicating Lamps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tank Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

HWD-49L-B

210202 - CB-Bulk Oil

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C		
Breaker Position					Local Remote	Breaker Status	Closed Open				
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cabinet Light		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Counter						
Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Foundation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hinges / Hasps / Latches and Handles		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
House Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max Amps Phase A						
Max Amps Phase B					Max Amps Phase C						
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Oil Level		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PCB Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Physical Condition		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tank Heater		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

HWD-54L-B

210706 - CB-SF6

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C		
Breaker Position					Local Remote	Breaker Status	Closed Open				
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cabinet Heater		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cabinet Light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduits		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Counter					Equipment Identification		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gas Pressure		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Gas Pressure					Gas Pressure - Phase A						
Gas Pressure - Phase B					Gas Pressure - Phase C						
Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hinges / Hasps / Latches and Handles		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Lubrication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max Amps Phase A						
Max Amps Phase B					Max Amps Phase C						
Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Springs Charged		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

HWD-5L-B

210203 - CB-Bulk Oil

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C		
Breaker Position					Local Remote	Breaker Status	Closed Open				
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cabinet Light		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Counter						
Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Foundation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hinges / Hasps / Latches and Handles		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
House Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max Amps Phase A						
Max Amps Phase B					Max Amps Phase C						
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Oil Level		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Substation Mobile Web Application - Inspection Forms

PCB Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tank Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HWD-72L-B
210571 - CB-SF6

Air Pressure	_____	Breaker Position	Sat	Unsat	N/A	C/C	Local	Remote	Sat	Unsat	N/A	C/C		
Breaker Status	Closed Open	Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cabinet Heater	<input type="checkbox"/>	Cabinet Light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compressor Belt	<input type="checkbox"/>	Compressor Tank Bled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conduits	<input type="checkbox"/>	Counter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	_____	_____	_____	_____
Equipment Identification	<input type="checkbox"/>	Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gas Pressure - Phase A	_____	Gas Pressure - Phase B	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Gas Pressure - Phase C	_____	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	Max Amps Phase A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	_____	_____	_____	_____
Max Amps Phase B	_____	Max Amps Phase C	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Physical Condition	<input type="checkbox"/>	Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HWD-79L-B
210185 - CB-Bulk Oil

Breaker Position	Local Remote	Breaker Status	Sat	Unsat	N/A	C/C	Closed	Open	Sat	Unsat	N/A	C/C		
Bushings	<input type="checkbox"/>	Cabinet Light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conduits	<input type="checkbox"/>	Counter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	_____	_____	_____	_____
Equipment Identification	<input type="checkbox"/>	Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grounding	<input type="checkbox"/>	Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
House Heater	<input type="checkbox"/>	Max Amps Phase A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____	_____	_____	_____	_____
Max Amps Phase B	_____	Max Amps Phase C	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Oil Leaks	<input type="checkbox"/>	Oil Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCB Label	<input type="checkbox"/>	Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Springs Charged	<input type="checkbox"/>	Tank Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HWD-BAT-E
100335- Battery

Cleanliness	<input type="checkbox"/>	Condition of Posts	Sat	Unsat	N/A	C/C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eye Wash	<input type="checkbox"/>	Fan or Vent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fluid Film	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

HWD-BAT-W
100370 - Battery

Apron and Goggles	<input type="checkbox"/>	Cleanliness	Sat	Unsat	N/A	C/C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Condition of Posts	<input type="checkbox"/>	Eye Wash	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fan or Vent	<input type="checkbox"/>	Filled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No	Yes		

Substation Mobile Web Application - Inspection Forms

Fluid Film Hydrometer

Pilot Cell Temperature oC _____

HWD-CHG-E

110258 - Charger

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
Charger Current A	_____				Equalize Voltage V	_____			
Equip. Current A	_____				Float Voltage V	_____			

HWD-T1

200271 - Power Xfmr-TC

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
Cabinet Dry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cabinet Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cabinet Light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Diaphragm in Relief Vent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gas Detector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Glass in Gauges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulators and Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max Oil Temp	_____			
Max Winding Temp	_____				Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PCB Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Silica Gel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HWD-T1-B

210122 - CB-Bulk Oil

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
Breaker Position	Local				Breaker Status	Closed			
	Remote					Open			
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counter	_____				Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	House Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Max Amps Phase A	_____				Max Amps Phase B	_____			
Max Amps Phase C	_____				Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PCB Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tank Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

HWD-T2

200236 - Power Xfmr-TC

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
Cabinet Dry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cabinet Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cabinet Light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Diaphragm in Relief Vent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gas Detector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Glass in Gauges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulators and Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Max Oil Temp	_____			
Max Winding Temp	_____				Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Substation Mobile Web Application - Inspection Forms

Oil Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PCB Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Silica Gel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HWD-T2-B

210123 - CB-Bulk Oil

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
Breaker Position	Local				Breaker Status	Closed			
	Remote					Open			
Bushings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conduits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counter	_____				Equipment Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hinges / Hasps / Latches and Handles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	House Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Max Amps Phase A	_____				Max Amps Phase B	_____			
Max Amps Phase C	_____				Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil Level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PCB Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Springs Charged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tank Heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

HWDE Telecommunication Equipment

RTU - SAGE 2100

	Sat	Unsat	N/A	C/C		Sat	Unsat	N/A	C/C
Signs of Burning (discoloration, odor, etc.)?	C/C				Signs of rodent activity (droppings, shavings, foul smell etc.)?	C/C			
	N/A					N/A			
	Satisfactory					Satisfactory			
	Un-Satisfactory					Un-Satisfactory			

HWDW Telecommunication Equipment

Signs of Burning (discoloration, odor, etc.)?	C/C				Signs of rodent activity (droppings, shavings, foul smell etc.)?	C/C			
	N/A					N/A			
	Satisfactory					Satisfactory			
	Un-Satisfactory					Un-Satisfactory			

Special Instructions:

Description	Date Complete	Notes
1. Please record all types, sizes and condition of SPARE POWER FUSES found in Substations where applicable on spreadsheet provided. This to include Power Xfmr, PTs and SS Fuses. Forward info to Electrical Maintenance Planners indicating the associated Substation.	2018-12-06	

Substation Mobile Web Application - Inspection Forms

Remarks / Details of Work Completed :

<u>Follow Up Work :</u>	<u>Suggested Priority :</u>
(1) _____	1 2 3 4 5 6
(2) _____	1 2 3 4 5 6
(3) _____	1 2 3 4 5 6
(4) _____	1 2 3 4 5 6
(5) _____	1 2 3 4 5 6
(6) _____	1 2 3 4 5 6
(7) _____	1 2 3 4 5 6
(8) _____	1 2 3 4 5 6

Priority Key :
 1 - Immediate (2 days) 2 - High (1 week) 3 - Medium (1 mth)
 4 - Low (3 mths) 5 - Project 6 - Deficiency (>3 mths)

Inspected By : Employee # : Hours : Date Completed :

Supervisor Name : Reviewed Date :

Work Order Number : Work Order Keyed :

Distribution Inspection and Maintenance Practices



DISTRIBUTION INSPECTION AND MAINTENANCE PRACTICES

Approved By: Byron Chubbs, P. Eng.
Approved Date: March 4, 2013
Revised By: M. R. Murphy, P. Eng.
Revision Date: December 11, 2017

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DISTRIBUTION INSPECTION AND MAINTENANCE PRACTICES

Policy Statement

Scheduled inspection and maintenance procedures shall be undertaken on all distribution lines. The inspection and repair process is intended to ensure safe and reliable operation. Regional Directors are ultimately responsible to ensure that distribution line inspection and maintenance activities are completed in accordance with this policy in their respective regions.

Public & Employee Safety

The Company owns and operates in excess of 9,000 km of distribution line in both rural and urban environments. Distribution line corridors may be used as trail-ways for snowmobile operators, ATV operators, skiers, hikers and others and are also regularly used by employees to carry out maintenance activities. Distribution lines and distribution rights-of-ways must be inspected and maintained in a manner that assures the safety of the public.

Regular inspections of distribution lines and timely repair of identified deficiencies will minimize risk to the public and employees. Those conducting distribution line inspections have the responsibility to inspect lines thoroughly with a keen focus on identifying potential public and employee safety hazards. Regional Directors, Managers of Operations and Supervisors responsible for maintenance have the shared responsibility to ensure that inspections are completed and any identified deficiencies and hazards are corrected in accordance with this policy.

Inspection Type and Frequency

All overhead primary distribution lines are required to have a minimum of one detailed ground inspection every seven years. However, Managers of Area Operations have the discretion to have more frequent inspections done if time and manpower allow.

Distribution Vegetation Management requires that distribution lines are inspected, on average, every three and a half years for brush clearing and tree trimming. These inspections will be completed as part of the distribution line inspection every seven years, and as a drive-by inspection once in between.

Pad mount transformers are to be inspected annually. These inspections should be completed at the same time as the detailed ground inspection or vegetation inspection if they are required during the same year.

Inspector Qualifications

To inspect Newfoundland Power distribution lines, an inspector must have the following minimum qualifications:

- Minimum 3 years of experience in the electrical utility industry in the operations or engineering area.
- Familiarity with the operation, maintenance and construction of utility lines.
- Familiarity with the use and operation of ATV's and snowmobiles.
- Basic understanding of the electrical and mechanical nature of utility lines.

Distribution Asset Management System

All distribution line preventative maintenance and inspections as well as deficiency identification and corrective maintenance activities shall be recorded in the Company's computerized asset management system known as Avantis.

The Information Systems and Regional Operations groups are responsible for administering Avantis and for training users. Maintenance Supervisors, Schedulers, Planners, Line Supervisors, Managers, and others within the Regional Operations group may have access to this system.

In addition to the software package, there are a number of business processes that detail the responsibilities and handoffs for each step in the asset management system. They can be found on Webster under the Regional Operations department in the Asset Management folder.

Distribution Line Inspections (7 Year Cycle)

Guidelines for detailed ground inspections of distribution lines and the associated record-keeping procedures are as follows:

- Personnel performing inspections shall use the necessary equipment to assist in the evaluation of distribution line components. For example, a hand held computer, binoculars, plumb bob, hammer, core sampler, screwdriver, crescent wrench, and digital camera may be needed.
- Inspection personnel shall assign a Maintenance Priority for each deficiency identified. This priority shall establish when corrective action is required (more information on assigning priority is given in Appendix A - Deficiency Reference Tables).
- Reasonable judgment is required in determining if something should be recorded as a deficiency. Each structure must be analyzed from the perspectives of Public Safety,

Employee Safety, Reliability and Environment to determine if action is warranted. For example;

- It is not the intent to bring all existing plant up to the current construction standards. Simply because a structure is not built to the latest construction standard does not mean it is deficient.
- It is not the intent to record every minor deficiency. For example, if the inspector determines that a minor chip in a pole does not undermine the strength of the pole and poses no danger to public or employee safety, reliability or environment, then it should not be entered into the maintenance system as a deficiency.

Distribution Vegetation Management Inspections (7 Year Cycle)

A distribution line shall have a vegetation inspection completed twice every seven years. This inspection shall be completed as part of the distribution line ground inspection every seven years, and as a drive by inspection once in between. The inspection should be documented on Hand Held Devices.

A vegetation deficiency can be one of two types. (1) A brush clearing deficiency which requires the entire width of the right of way to be cleared. A single brush clearing deficiency may cover an area several kilometers long. (2) A tree trimming deficiency in which a single tree or several trees at the same location are contacting or are in danger of contacting the line and will need to be trimmed. Each tree or small group of trees at the same location is considered a single deficiency.

To assign a priority to the vegetation deficiency, the inspector must take into consideration the details of the vegetation growth, as well as the following:

- Public and employee safety
- The physical location of the line (populated or remote area, near existing roadways or cross-country, etc.)
- The anticipated growth rate (depending on the type of vegetation)

Padmount Transformer Inspections (Annual)

Padmount transformers shall be inspected at least once per year and maintenance to the transformer completed in a timely manner. The inspection should be documented on Hand Held Devices.

This is a visual inspection only.

Appropriate Personal Protective Equipment is to be worn at all times.

Distribution Line Component Inspection Guidelines

Distribution line inspections require evaluation of the following components. For each component there are guidelines to follow during inspections. These guidelines do not cover all possible deficiencies that may exist on each component, and reasonable judgement must be used by the Planner in identifying and prioritizing deficiencies.

Structures

Wood Poles:

During each distribution line inspection, all wood poles require a detailed visual inspection. Depending on the results of the visual inspection a sounding test may be performed. If the visual inspection and/or the sounding test indicate a problem, a core-sampling test may be performed to aid in the evaluation of the pole.

- Inspect and determine condition of pole at ground line and above for rotting, deterioration, splitting, cracks, breaks, burns, woodpecker holes, insect infestation and plumbness.
- Ensure pole is properly backfilled and not undermined.
- Where applicable, inspect condition of crib timber. Ensure crib is properly rock filled.
- Check structure for plumbness or any degree of misalignment.
- Check for structure number tags.
- Ensure that pole grounds are installed on all poles with transformers on them. Ensure that it is rigidly supported, it has not been cut and a ground guard is present and secured

Steel Towers:

- Inspect tower for damaged or missing members. Check member connections for loose or missing nuts and bolts. Check members for buckling.
- Inspect tower for corrosion. Check tower for plumb and any degree of misalignment. Check for structure number tags.
- Inspect backfill conditions around tower footings and legs. Check footing for deterioration. Inspect foundation for surface cracks or splitting. Check that reinforcing is not exposed. Inspect anchor bolts for cracks, rusting or missing anchor nuts.
- Check tower for missing or damaged Danger Signs. Ensure that signs are clearly visible. Check condition of anti-climbing barriers. Anti-climbing barriers and warning signs should be installed on all steel towers. It is a significant public safety issue for barriers or signs to be missing and the deficiency should be classified as a TD1.

Hardware

Cross Arms and Braces:

- Inspect crossarms for rot, splits, cracks and twisting that may cause the conductor to fall to the ground. Also, inspect for burn marks.
- Check that cross arms or braces aren't loose, broken or hanging.

Platforms:

- Check that platform brace isn't loose, broken or hanging.
- Check that platform deck isn't failing or sagging.

Anchors and Guys:

- Inspect guys and pre-formed grips for wear, breaks, slackness and corrosion.
- Ensure guy guards are secure and installed on every guy wire. A missing guy guard is a significant public safety issue and should be classified as high priority.
- Inspect anchor rod and backfill conditions. Check for anchor rod damage. Ensure anchor is not undermined or pulling. Ensure that anchor eye is above ground level.
- Check that all guys are either insulated or effectively grounded to neutral/ground wire.
- Any anchor rods with no guy attached should be identified as a high priority work order if the guy is required or cut off by the planner on-site if the guy is not required.

Insulators

Polymer Type:

- Inspect for broken, split, misaligned, flashed or defective insulators
- Check non dead-end insulators for uplift
- Check that stand off brackets aren't twisted, delaminated or broken

Porcelain Type:

- Inspect for broken, cracked, chipped, misaligned, flashed or defective insulators.
- Check non dead-end insulators for uplift.
- Check that stand off brackets aren't twisted, delaminated or broken
- 2-piece and 8080 insulators should be identified for removal. If they are damaged they should be given a high priority.

Conductor

Primary and Neutral Conductors:

- Check for excessive sag that could result in phases slapping together. Also check for too much tension that could result in vibration induced problems such as broken ties, insulators, or conductor breaks.
- Inspect conductors for safe clearances from buildings, roads, ground, and other power/communication lines.
- Inspect conductor for broken or frayed strands, burn marks, foreign objects.
- Inspect splices for abnormal condition.
- Inspect dead-end assemblies for any abnormal condition.
- Where required, inspect for damaged or missing conductor warning markers.
- Check that tie wires or clamps are not loose or broken.
- Automatic splices, or quick sleeves, should be identified for removal.

Stirrups/Leads/Primary Connections:

- Check hardware for any visible deficiency that may result in conductor falling to the ground.
- Check for broken or corroded conductor near connections.
- Check leads for excessive length.
- Visually inspect conductor around hot line clamps for corrosion and broken strands.

Underground Cables/Conduit/Guards:

- Inspect cable and pothead for damage.
- Check for bad connections.
- Ensure guards are present and secured and grounded as required.

Primary Devices

Pole Mounted Transformers:

- Inspect transformers for rust and leaks. Transformers that are leaking or are rusted to the point that a leak appears imminent must be replaced immediately.
- Ensure that all transformers have PCB identification tags installed (Yellow, Green or White). Particularly, transformers in Protected Public Water Supply Areas contain a green or white PCB identification tag. If no tag is installed then the transformer oil

must be tested. Ensure to note transformer number, civic address, and addresses of customers fed off of transformers to be PCB tested.

- Check for cracked or broken bushings.
- Check for proper tank ground. Each tank is to have a minimum of two independent paths to ground.
- Check that secondary leads aren't rubbing against bottom rim of tank.
- Check for blown fuses.
- Check that animal/bird guards are properly installed and aren't broken or hanging off.
- 25 kVA and 50 kVA unpainted stainless steel ABB transformers without reinforcing brackets shall be identified to have reinforcing brackets installed.
- Transformers with pole mounting brackets showing signs of bending or splitting shall be replaced immediately. Transformers with known design flaws but are not currently exhibiting signs of failure shall be noted for future support bracket installation. Ensure to note if the transformer is located in a sensitive location such as school yard or other high traffic area.

Metering Tanks:

- Inspect tanks for rust and leaks.
- Check for cracked or broken bushings.
- Check for proper tank ground.
- Check that secondary leads aren't rubbing against bottom rim of tank.

Lightning Arrestors:

- Check that Lightning Arrestors (LA) are installed. LA's should be installed on distribution transformers if there is any other reason to climb or otherwise work the pole above ground level. In addition LA's should be installed on all underground dip poles, and on all equipment such as down line reclosers, regulators, and sectionalizers.
- Inspect for broken, cracked, chipped, misaligned, flashed or defective insulators.
- Checked that lightning arrestor has not failed.

Capacitors:

- Inspect tanks for rust and leaks.
- Check for cracked or broken bushings.
- Check for proper tank ground.
- Check for blown fuses.

Switches

Cutouts:

- Ensure disconnects are correctly labeled.
- Check that Current Limiting Fuses (CLF) are installed as required. This includes;
 - All cutouts where fault levels are greater than 10,000 Amps.
 - On cutouts protecting distribution transformers where fault levels are greater than 5,000 Amps and less than 10,000 Amps.
 - On cutouts protecting distribution transformers that are located in proximity to areas where the public is known to gather (e.g. near bus stops, near play ground equipment, etc.) where fault levels are greater than 3,000 Amps but less than 5,000 Amps.
- All porcelain cutouts, except on individual transformers, shall be identified for replacement.

In-Line Switches:

- Ensure disconnects are correctly labeled.
- Ensure blades are in fully open or closed position.
- Check insulators for deterioration or damage.

Gang Operated Switches:

- Ensure disconnects are correctly labeled.
- Check switch for signs of tampering. Check locks and locking mechanism are intact and secure. Gang-operated switches in areas readily accessible to the public are required to be double-locked. Inspect switch handle, pipe, etc. for damage and proper alignment. Inspect all ground connections for tightness, corrosion and damage.
- Check that the switch blades are in the fully open or the fully closed position as per its normal configuration.
- Inspect Insulators for damage.
- Ensure ground mat has not been disturbed. Check for missing or damaged danger signs. Ensure that signs are clearly visible.

Vegetation and Right of Way

To assign a priority to the vegetation deficiency, the inspector must take into consideration the details of the vegetation growth, as well as the following

- Public and employee safety.

- The physical location of the line (populated or remote area, near existing roadways or cross-country, etc.).
- The anticipated growth rate (depending on the type of vegetation).

Brush Clearing:

- Check condition of vegetation growth along right-of-way.
- When recording a brush clearing vegetation deficiency, be sure to record information on the type of brush to be cleared (deciduous or coniferous), the density of brush to be cleared (Light, Medium, Heavy), the average height of the brush, and the start and end points of the section on line requiring brush clearing.
- Check for danger trees that may contact the conductor or trees close to the line that can be easily climbed. Remember that a persons weight on a weak branch could cause it to deflect enough to contact the line.

Tree Trimming:

Public Safety and Reliability are important factors in determining the priority of the danger tree deficiency. When recording a danger tree deficiency, it is important to make the following considerations:

- Whether the tree is in close proximity to the energized high-voltage conductors such that it may make contact. Consider that a branch may swing or bend into the line due to the weight of a climber, wind or buildup of snow or ice.
- Whether the tree is easily accessed from the ground and climbable.
- Whether individuals who are possibly interested in climbing the tree frequently visit the site that the tree occupies.

Encroachments:

- Check for encroachments by foreign structures, unauthorized excavation or fill areas, etc. These should be identified as a deficiency if the Planner judges them to be a public safety hazard.

Distribution Padmount Transformer Inspection Guidelines

Distribution padmount transformer inspections require evaluation of the following components. For each component there are guidelines to follow during inspections. These guidelines do not cover all possible deficiencies that may exist on each component.

Exterior

- Ensure the company number is present and consistent with the Avantis hierarchy
- Check for deficiencies in the door and locking mechanism.

- If there is no danger sticker present, install one.
- Check for signs of oil leaks and severe rusting. Less severe rusting that will not lead to failure within the next year should not be noted as a deficiency.
- Check for proper placement of the padmount transformer on the pad.
- Ensure a snow marker is installed on the unit where required.
- Check for a PCB label. If the label is missing but the PCB content can be found from the nameplate or a test sticker on the interior, apply the appropriate label.
- Check for problems with the foundation, fences or posts and remove any debris from inside. Note any vegetation control required.

Hardware

- Replace any missing bolts and broken locks.
- Check for test caps on the load break elbows.
- Ensure fault indicator is present and reset.

Nameplate

- Verify inclusion and completeness of nameplate information in the handheld.

Bushings

- Ensure the primary and secondary bushings are not damaged.

Connections

- Check condition of all primary and secondary connections. Make note of any visible damage or bonding requirements.

Lightning Arrestors

- Check for lightning arrestors on the primary dip pole.

Typically any transformer removed from service that is greater than 30 years old, requiring painting or testing, should be handed over directly to the waste disposal contractor for scrapping. Units less than 30 years old should be shipped to the Electrical Maintenance Centre for refurbishment if in good condition, and if

- Leaking
- PCB status uncertain
- Involved in an insurance claim

It should also be noted on the work orders that padmounts being scrapped directly from the field should have their nameplates removed and the company number of the padmount written on the back of the nameplate. Nameplates should then be shipped to the EMC.

Also, any units being shipped to the EMC should be tagged with removal details including who removed the padmount from service, where it was previously installed, removal date and reasons why the unit was removed from service.

Communications Plant Inspections - Bell

As part of a distribution line inspection it is required to also inspect any communication equipment belonging to Bell Canada on joint use poles. It is not required to prioritize these deficiencies but anything that in the Planner's judgment is an emergency should be noted and reported as such. Plant belonging to other communication providers are not required to be inspected. Pole and anchor deficiencies in Bell's pole setting areas should follow the existing process for this type of work.

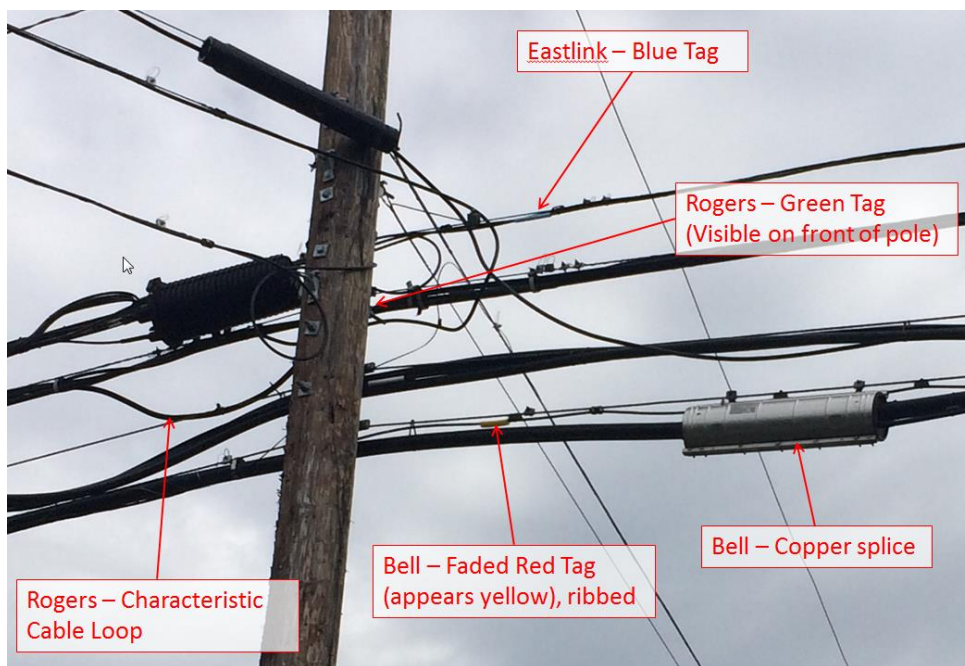
Identification of Bell Equipment

Equipment belonging to different communications companies can be identified by coloured tags present at pole attachments.

Bell – Red tags. These tags tend to fade to orange then yellow over time so care is required to not confuse with Eastlink's longer yellow tags. Bell equipment tags also have a 'ribbed' appearance similar to weeping tile.

Rogers – Green tags. Rogers also has a 'loop' at each pole attachment.

Eastlink – Yellow or blue tags. Eastlink's yellow tags can be distinguished from Bell's faded tags due to their longer length.



Messenger Strand

- Visually Inspect condition of strand for breakage, severe rust, frayed ends.
- Visually inspect for broken or loose lashing wire.
- Note locations for improperly sagged strand / cables requiring re-tensioning
- Note areas of inadequate clearance
- Note areas of inadequate separation from neutral / power space.
- High voltage ground missing / detached

General

- Visually check for issues with splice closures, strand attachments: improperly strapped, loosely hanging, covers open, etc.
- Vertical riser cables / conduit: visually check for improperly strapped, improper duct sealing; general damage
- Housekeeping: cleanup of utility related debris around pole
- Duplicate Poles / removal required
- Outstanding transfers

Additional Planning Details

When recording a deficiency, it is important to collect as much information as possible to assist in planning a repair.

Outage Requirements

- No Outage
- Single Transformer Outage
- Feeder Tap Outage
- Full Feeder Outage
- Multiple Feeder Outage
- Joint Use

Site Considerations

- Environmental
- Near School or Hospital
- High Traffic Area
- Within 15m of PPWSA
- Truck Accessible
- Number and Type of Customers Affected

On Site Repairs

All deficiencies shall be recorded in the Distribution Asset Management System with the exception of minor repairs that can be completed on site. These minor repairs may be completed by the inspector during a distribution line inspection, or by a line crew completing planned repairs.

The following repairs may be completed on site during a distribution line inspection. The inspector shall carry the required materials to complete the repair.

- Replace or reattach a missing guy guard.
- Tighten a loose pre-form connection.
- Replace or reattach a missing ground cover.
- Add staples to an unsecured ground wire or ground cover.
- Replace or reattach a sign or equipment label.

The following repairs may be completed on site during a padmount transformer inspection. The inspector shall carry the required materials to complete the repair.

- Replace missing or broken bolts and locks.
- Install or reset fault indicators as required.
- Install danger stickers.
- Install PCB label if PCB information is available but label is missing.

A line crew that identifies a deficiency while completing a separate job shall report the deficiency to their supervisor. This deficiency will be entered into the Distribution Asset Management System and planned repairs will be completed. However, it is acceptable that minor repairs be completed on site if they can be completed safely and in a short time. A rule of thumb to use is if the repair is simple and can be completed in less than 20-30 minutes, it shall be completed on site and not recorded as a deficiency.

Any on-site repairs completed on Bell equipment is to be noted for billing to Bell.

Maintenance Classifications

All defects identified through the inspection process are given one of the following classifications based on the nature of the abnormal condition. Unless otherwise stated or directed, the response times shall be as follows:

PRIORITY	RESPONSE TIME
Emergency	Immediate
TD1	1 Week
TD2	1 Month
TD4	Next Budget Cycle
TD5	Opportunity Work Only

The shared responsibility for scheduling maintenance rests with the Planner and Line Supervisor.

If the Planner notes a deficiency that is considered to be an Emergency, he shall immediately notify the area Manager.

If a deficiency is noted to be a TD1 or TD2 priority, they will not be included on monthly maintenance schedules. It is the Planner's responsibility to ensure the appropriate personnel, whether Line Supervisors for line work or Maintenance Supervisor for contract maintenance, is aware of the work and of the high priority nature of the work.

A TD1 priority will permit time for formulating a plan of action to correct the deficiency. Planning should begin immediately to ensure corrective action is taken as quickly as possible after the identification of the deficiency.

Regional Managers / Supervisors will ensure corrective maintenance work is completed, in the time frames outlined above, to prevent failure from occurring.

While it is not possible to cover all conditions that a Planner may encounter, the general guidelines found in Appendix A can be used to assist in the classification of defects. In practice, the Planner will assign priority based on his knowledge and experience.

Appendix A- Deficiency Reference Tables

Wood Poles

DEFICIENCY	EMERGENCY	TD1	TD2	TD4	TD5
Damaged	Broken	Serious Horizontal Cracks			
Pole Rot		Rotted to Imminent Failure		Rotted - Failed Core Test	
Woodpecker Holes				Severe Woodpecker Holes	
Unauthorized Attachments					Unauthorized Attachments
Off Vertical	Severe Lean - Failure Imminent			Lean >10°	
Pole Crib	Major Frame Damage - No Longer Supporting Pole			Frame Damaged - Rocks Becoming Loose	
Pole Ground	Grounds Cut or Broken Near Ground Level Repaired by Planner During Inspection			Grounds Cut or Broken Above Ground Level	Ground Cover Missing Staples Missing Ground Rod Exposed No Pole Ground Installed
Backfilling	Large Hole – Public Safety Hazard		Pole Not Supported		

Cross Arms and Braces

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Cross Arm Damaged	Broken - Floating Phase Severely Crooked - Failure Imminent	Broken		Severe Rot or Cracked
Brace Bent, Missing or Hanging			Missing or Hanging	

Platforms

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Brace Damaged			Brace Loose	Severely Bent
Deck Damaged	Imminent Failure		Broken Beam	Deck Sagging

Anchors and Guys

DEFICIENCY	EMERGENCY	TD1	TD2	TD4	TD5
Guard Missing	Replaced by Planner During Inspection				
Preform Rusting			C or E Structure	All Others	
Loose Guy				Loose Guy	
Preform Unravelling			C or E Structure	All Others	
Broken Guy	C or E Structure or Public Safety		All Others		
Broken Rod or Fitting	C or E Structure or Public Safety		All Others		
Backfilling	Large Hole – Public Safety Hazard		Pole Not Supported	Pole Support Uncompromised	
Anchor Buried				Rotting preform	Stable
Ungrounded / Uninsulated	Pole has damaged insulators or damaged porcelain cutout		Rock anchor, undamaged 2-piece or 8080 insulators or porcelain cutout	All other ungrounded or uninsulated guys	

Polymer Type Insulators

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Split/Broken	Broken	Polymer Split/Rod Exposed		Splits, Skirts Missing
Floating	Floating			
Stand-Off Bracket	Broken			

Porcelain Type Insulators

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Cracked/Broken	Broken	Insulator Severely Cracked		Chips or Cracks, Skirts Missing
Floating	Floating			
Stand-Off Bracket	Broken			
2 Piece / 8080 Insulators		Damaged		All Other Locations

Primary Conductor

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Sag	Public Safety Hazard			Could Cause Slapping
Clearances to Buildings/Signs	Exceeds CSA Standards			Above Dwelling Within CSA Standards
Broken Strands	>1/4 Strands Broken		<1/4 Strands Broken Broken Pencilling	1 - 2 Strands Broken Temporary Repairs
Floating	Floating			
Tie Wires or Clamps	Broken			Loose or Unravelling
Missing Line Guards				On Aluminum or Stranded Copper
Warning Markers	Hanging			Becoming Loose or Missing
Quick Sleeves				All Locations

Neutral

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Sag	Public Safety Hazard		Could Cause Slapping	
Clearances to Buildings/Signs	Exceeds CSA Standards			Above Dwelling Within CSA Standards
Broken Strands	>1/4 Strands Broken		<1/4 Strands Broken Pencilling	1 - 2 Strands Broken Temporary Repairs
Floating	Floating			
Warning Markers	Hanging			Loose or Missing
Quick Sleeves				All Locations

Stirrups/Leads/Primary Connections

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Stirrups Missing				
Lead Length Excessive				Could Cause Slapping
Broken Strands		>1/4 Strands Broken on Main Trunk	<1/4 Strands Broken on Main Trunk	<1/4 Strands Broken – Not Main Trunk Temporary Repairs
Pencilling on Solid Leads		Pencilling		

Underground Cables/Conduit/Guards

DEFICIENCY	EMERGENCY	TD1	TD2	TD4	TD5
Guard Loose			Guard Hanging Off		Guard Loose
Guard Missing		High Traffic Pedestrian Area		Low Traffic Area	
Cable Damaged	Cable Severely Damaged/Broken		Jacket Damaged		
Pothead Damaged			Excessive Pitch Leaking		Minor Pitch Leaking
Cracked/Broken Bushing	Broken	Insulator Severely Cracked			Minor or Moderate Chips or Cracks, Skirts Missing

Pole Mounted Transformers

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Tank Ground	Ungrounded	Only 1 Ground		
PCB Label				Missing
Cracked/Broken Bushing		Bushing Completely Broken		Chips or Cracks, Skirts Missing
Leaking/Weeping	Leaking or Weeping			
Rusting	Rust Causing Leaking or Weeping			Severe Rust
Blown Fuse	Blown Fuse			
Mounting Bracket	Bracket split/ Showing signs of failure		Sensitive locations	Design flaw identified but not showing signs of failure

Metering Tanks

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Tank Ground	Ungrounded			
PCB Label Applied				Missing
Cracked/Broken Bushing		Bushing Completely Broken		Chips or Cracks, Skirts Missing
Leaking/Weeping	Leaking or Weeping			
Rusting	Rust Causing Leaking or Weeping			Severe Rust

Lightning Arrestors

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Floating	Floating			
Grounded Incorrectly/Ungrounded				Grounded Incorrectly/Ungrounded
Insulator Damage	Broken	Severe Splits or Cracks		Splits or Cracks, Skirts Missing
Failed	Failed. No Power to Customer			Failed. Power Still On.
Missing				Area prone to lightning strikes

Capacitor Banks

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Tank Ground	Ungrounded			
Leaking/Weeping	Leaking or Weeping			
Blown Fuse	Blown Fuse			
Insulator Damage	Broken	Severe Splits or Cracks		Splits or Cracks, Skirts Missing
Rusting	Rust Causing Leaking or Weeping			Severe Rust

Padmount Transformers

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Snow Marker			Missing	
Rusting	Rust causing leaking or weeping		Severe rust; leak imminent in less than 1 year – replacement required	Surface rust – painting required
PCB Label				Missing
Defective door	Broken off unit		Broken hinge	
Defective lock/missing bolts	Replace on site			
Xfmr moved off pad			Moved	
Incorrect Co. Number			Missing/Incorrect Co. Number	
Vegetation				Vegetation management required
Primary/Secondary bushings		Broken		
Test cap on load break elbows			Missing	
Ground Strap				Broken/Missing
Connections/Terminations	Completely broken		Damaged	

Cutouts

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Switch Damaged	Switch Damaged			
Insulator Damage	Broken	Severe Splits or Cracks		Splits or Cracks, Skirts Missing
Porcelain				At Tie Points, Main Trunk, Large Taps, Major Customers
Label Missing			Label Missing	
Current Limiting Fuse Required				CLF Required

In-Line Switches

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Insulator Damage	Broken	Severe Splits or Cracks		Splits or Cracks, Skirts Missing
Label Missing			Label Missing	

Gang Operated Switches

DEFICIENCY	EMERGENCY	TD1	TD2	TD4
Grounding	Switch Ungrounded No Ground Mat			
Insulator Damage	Broken	Severe Splits or Cracks		Splits or Cracks, Skirts Missing
Label Missing			Label Missing	

Vegetation and Right-of-Way

DEFICIENCY	EMERGENCY	TD1	TD2	TD4	TD5
Tree Trimming	Touching Conductor or Showing Signs of Burning		Within 2ft of Primary Conductor		
Brush Clearing	Touching Conductor or Showing Signs of Burning		Within 2ft of Primary Conductor	Above Neutral but Greater than 2ft from Primary Conductor	
Encroachments					Encroachments