Q. Please provide a description of Newfoundland Power Inc.'s industry best practice maintenance program for its distribution assets (2007 Capital Budget Plan, Graph 2, page 16).

A. Newfoundland Power's industry best practice maintenance program for distribution assets referenced on page 16 of the 2007 Capital Budget Plan are documented in the Company's *Distribution Inspection Standards*. This document was previously filed with the Company's 2004 Capital Budget Application. A copy of this document is provided in Attachment A.

Distribution Inspection Standards

NEWFOUNDLAND POWER
A FORTIS COMPANY

Distribution Inspection Standards

DISTRIBUTION INSPECTION AND MAINTENANCE PROCEDURES

Table Of Contents

Distribution Inspection Standards

DISTRIBUTION INSPECTION AND MAINTENANCE PROCEDURES

Policy Statement

Scheduled inspection and maintenance procedures shall be undertaken on all distribution lines to provide safe and reliable operation. Regional Managers shall be responsible for the required distribution line inspections and maintenance in each region.

The results of these inspections and the maintenance work that is completed to correct any deficiencies shall be recorded in the Company's Distribution Line Inspection Database. (DLID)

Inspection Procedures

Inspection Type and Frequency

All overhead primary distribution lines are required to have a minimum of one detailed ground inspection every five years. Climbing/bucket Inspections shall only be performed on distribution structures/lines to:

1) Verify questionable defects picked up from ground inspection.

2) Assess the condition of specific components (i.e. insulators, hardware, and cross-arms) where ongoing service problems exist.

Ground Inspections

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

- All personnel performing inspections on distribution lines shall have appropriate training.

- The inspection will cover poles, conductors, cross-arms including hardware, transformers, grounding (pole and transformers), anchors and guys.

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

- As distribution lines are inspected, a Distribution Line Inspection Report for each feeder will be completed (see Appendix 2). This information will then be entered into the DLID. The report shall then be reviewed by the appropriate Area/Regional Superintendent or designate.

- 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 the Maintenance Procedures section).

A deficiency list shall be established and updated as defects are corrected and when new defects are identified. The purpose is to provide an up-to-date list of outstanding defects on each distribution line. Inspection personnel shall use this list for each inspection to check the status of known defects.

Inspection Process

Distribution line inspections require evaluation of the following components:

Wood Pole Structures:

- Inspect and determine condition of pole(s) 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 (More information is given in the section – Detailed Wood Pole Inspection).

- Where applicable, inspect condition of timber cribs. Ensure crib is properly rock filled.

- Check structure for plumbness or any degree of misalignment.

- Check for structure number tags.

- Record pole numbers for structures with deficiencies.

Guys and Anchors:

- Inspect guys and pre-forms for wear, breaks, slackness and corrosion. Ensure guy guards are installed in areas that are easily accessible by the public.

- 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.

Hardware:

- Inspect crossarms for rot, splits, cracks and twisting that may cause the conductor to fall to the ground. Also, inspect for burn marks.

- Inspect for broken, cracked, chipped, misaligned, flashed or defective insulators. Check non-dead end insulators for uplift.

- Check for improperly installed cutouts and problematic cutouts that have been known to fail.

- Check hardware for any visible deficiency that may result in conductor falling to the ground.

Conductors and Accessories:

- Check for excessive sag that could result in phases slapping together causing phase-to-phase faults.
- 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 dead-end assemblies for any abnormal condition.
- Where required, inspect for damaged or missing conductor warning markers.

Right of Way:

- Check for danger trees that may contact the conductor, or allow someone to climb the tree contact the conductor.
- Check for encroachments by foreign structures, unauthorized excavation or fill areas, etc.

Grounding:

- Check that each transformer contains at least two independent paths to ground.
- Ensure that pole grounds exist on all poles with transformers on them. Ensure that it is rigidly supported, it has not been cut and a ground guard is present.
- Ensure that any pole that has the neutral supported by a spool is properly grounded or is identified in the inspection for replacement with a neutral bracket.

Structures:

- Inspect for safety issues.
- Inspect vertical structure to horizontal structure transition points for lower cross-arms.

Transformers:

- Inspect transformers for rust and leaks. Questionable transformers must be noted for re-inspection.
- Ensure that all transformers have PCB identification tags installed. Particularly, transformers in Protected Public Water Supply Areas contain a green PCB identification tag.

DETAILED WOOD POLE INSPECTIONS

To complement the required inspection of wood poles discussed under the Inspection Process section, this section describes testing procedures to be used in determining the integrity of distribution line wood poles.

Wood Pole Testing Frequency

During each distribution line inspection, all wood poles require a detailed visual inspection and a sounding test.

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.

Types of Wood Pole Tests

Visual Inspection:

Inspect the condition of the pole from the ground line to the top on all quadrants. The pole shall be examined for the following defects: pole top rot, external decay, woodpecker damage, fire damage, cracks, and sign of insect infestation.

Sounding Test:

Using a flat faced hammer, sound the pole surface at regular intervals on all quadrants from the ground line to 6 feet 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 ground line.

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 boreholes shall be determined by the sounding test. All boreholes should be plugged with a tight fitting, wooden plug. Also, to avoid transfer of decay, the core sample must be cleaned with an approved fungicide.

MAINTENANCE PROCEDURES

Upon completion of a distribution line inspection, scheduled preventative maintenance shall ensure the distribution system maintains a high degree of integrity and reliability. This section establishes guidelines for maintenance procedures.

Maintenance Classification

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

CLASSIFICATION	RESPONSE TIME
Emergency Immediate security of the line is at risk	Immediate
Priority 1 Defects which if left could result in an interruption	One Month (approximately)
Priority 2 Defects of less consequence	Within 12 months
Priority 3 Defects of minor concern: no repairs necessary	Continue to monitor condition for possible upgrading of classification

• Table. Maintenance Response Time.

The responsibility for scheduling maintenance rests with the designated Area/Regional Superintendent. Defects defined, as Emergency shall be reviewed within 24 hours of identification for the purpose of initiating repairs immediately or downgrading the reported condition. This review may require a second field visit by designated operating personnel.

It is not possible to cover all conditions that inspection personnel may encounter. The table in **Appendix 1** gives a general guideline that can be used to assist in classifying defects.

MAINTENANCE REPORTS

To monitor maintenance performed on the distribution system, completion of a Maintenance Report is required for each distribution line. The report shall be a yearly cumulative list of maintenance work performed.

Appendix 1

ITEM	EMERGENCY	PRIORITY 1	PRIORITY 2	PRIORITY 3
Poles, Crossarms	Broken	Serious cracks or deterioration	Moderate cracks or deterioration	Minor cracks or deterioration
Insulators	Emergency or Priority 1 depending on extent of damage		Minor defects	
Conductor Damage	More than 1/4 strands broken	Less than 1/4 strands broken	1 or 2 strands broken	
Hardware	Missing or Damaged: High risk of causing interruption	Missing or Damaged: Moderate risk of causing interruption	Missing or Damaged: Low risk of causing interruption	Other minor defects: Very Low risk of causing interruption
Guys	Severely rusted, broken or disconnected on angle or deadend structures	Covered preforms on deadends; severely rusted, broken or disconnected on other structure types	Rusted, slack or ungrounded guys	
Anchors/Rod	Rod cut off on angle/deadend struc.	Anchor pulling out on angle/deadend struc. or rod cut off on other struc.	Anchor pulling out on other structure types or anchor eye underground.	
Transformers	Severely rusted XFMR with High risk of leaking, XFMRS without green PCB tags in PPWSA	Rusted XFMR with Moderate risk of leaking.	XFMR without two independent paths to ground	
Pole Grounding			Cut, or unsupported pole Grounds. No pole ground guard installed	
Corrosion (any component)		Severe cases	Moderate cases	Minor cases
Encroachments	Active operations with clearance concerns and/or high risk of causing interruption or injury	Non-active operations with clearance problem	Low risk cases	Cases deemed tolerable
Danger Trees	High risk of person climbing and touching line	Risk of falling on line		
Leaning Structures	Line clearance in question or high risk of falling over	Leaning over 6 ft.	Leaning between 2ft - 6ft	Leaning less than 2 ft
Abandon Equipment	High safety hazard	Moderate safety hazard	Low safety hazard	
Underground Conduit	High safety hazard	Moderate safety hazard	Low safety hazard	
Missing Danger Signs	High safety hazard	Low safety hazard		
Vertical to Horizontal Transitions			Crossarm is not lowered at transition point	
Conductor Sag	Active operations with clearance concerns or high risk of phases slapping together	Non-active operations with clearance problem or moderate risk of phases slapping together	Low risk of phases slapping together	
Neutral Conductor			Attached to pole with spool, (Must be grounded or replaced)	

Appendix 2

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DISTRIBUTION FEEDER INSPECTION REPORT

Feeder #:________

Date: ___________

POLE #	STRUCTURE TYPE	PRIORITY	LOCATION	DESCRIPTION OF DEFECT	COMMENTS

Inspected By: ___________________________

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