

ENVIRONMENTAL MANAGEMENT PROGRAM DESCRIPTIONS

Newfoundland Power Inc.

2010

Introduction

Newfoundland Power is the principal distributor of electricity in the Province of Newfoundland and Labrador, serving approximately 239,000 customers throughout the island portion of the Province, representing approximately 85 per cent of the Province's electricity customers. The balance of the population is served by the Province's other electric utility, Newfoundland & Labrador Hydro ("Newfoundland Hydro"), a Crown corporation that also serves several larger industrial customers in Newfoundland. Sales to residential customers have consistently generated approximately 60 per cent of the Company's revenue. Approximately 92 per cent of the electricity that Newfoundland Power sells to its customers is purchased from Newfoundland Hydro. The Company generates the remainder of its energy requirements.

Newfoundland Power operates 30 generating plants comprised of 23 small hydro and 7 thermal plants. As many of the plants were constructed when environmental control was minimal, there was little done to implement controls to prevent and/or contain potential spills. The Company also has approximately 11,000 km of transmission and distribution lines, 130 substations, oil filled electrical equipment and line trucks. Associated with these plants and equipment are various quantities of fluids, which may, on occasion, be accidentally released into the environment. These fluids typically consist of lubricating oil for bearings, glycol for cooling systems, insulating oil for electrical equipment and hydraulic fluid for vehicles. In the case of oil filled electrical equipment rust has been a major cause factor for spills. Also hydraulic failures on line trucks are a significant contributor to spills.

Relevant Newfoundland Power Environmental Policy Commitments

- Committed to prevention of pollution.
- Committed to meeting the requirements of applicable environmental legislation, regulations, and accepted standards of environmental protection.
- Committed to continual improvement in environmental performance.

Summary of 2010 EMS Objectives, Targets and Programmes:

1. Wooden Penstock Removal Program
2. Wicket Gate Bushing Replacement Program
3. Runner Replacement Program
4. Hydroelectric Energy Production Increase
5. Bearing Oil Cooling System Control Enhancement Program
6. Lookout Brook Sump Modification Program
7. PCB Phase-Out Program
8. Bushings and Instrument Transformer Phase Out Program
9. Sulphur Hexafluoride (SF₆) Management Program
10. Mini-Padmout Transformer Accelerated Replacement Program
11. Mercury Vapour Street Light Replacement Program
12. Customer Energy Conservation Program

1. WOODEN PENSTOCK REMOVAL PROGRAM

Background

The Company utilizes penstocks to convey water from forebay reservoirs to the hydro plants. In the past, many of these penstocks were constructed using creosote treated wooden staves which over time leached creosote from the wood creating contamination. Leaching continues as long as the wooden penstock is present. As the wooden penstocks deteriorate, the Company has been replacing them with either steel or fiberglass, thus eliminating the source of contamination. With this in mind the following corporate objective was set:

Corporate

Corporate Generation Objective #1

- Eliminate 9 creosote treated wooden penstocks between 2001 and December 31, 2014.

Corporate Generation Target # 1

- Complete review of conditions of penstocks at Victoria, Heart's Content, Petty Harbour and Pierres Brook by December 31, 2010 to determine priorities for the next five years. (See Note 1.1)

Subsequent targets will be set annually to coincide with budget preparation and PUB approval. The following department and group objectives and targets are set in order to realize those that were set corporately:

Engineering Department

Generation Engineering Dept Objective #1

- Replace 9 creosote treated wooden penstocks by December 31, 2014 with either steel or fiberglass.

Generation Engineering Dept Target #1

- Complete review of conditions of penstocks at Victoria, Heart's Content, Petty Harbour and Pierres Brook by December 31, 2010 to determine priorities for the next five years. (See Note 1.1)

Generation Group

Generation Engineering Group Objective #1

- Complete review of conditions of penstocks at Victoria, Heart's Content, Petty Harbour and Pierres Brook by December 31, 2010 to determine priorities for the next five years. (See Note 1.1)

Generation Engineering Group Target #1

- Complete review of conditions of penstocks at Victoria, Heart's Content, Petty Harbour and Pierres Brook by December 31, 2010 to determine priorities for the next five years. (See Note 1.1)

Responsibility

The responsibility for ensuring this program is completed and the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall corporate responsibility for the program rests with the Manager, Engineering – Gary Murray.

The responsibility for completing the review will be Superintendent, Civil Engineering – Gary Humby

Resources Required

Superintendent, Civil Engineering and staff for the review and analysis.

Methodology

Professional engineering principles and practices will be applied. Experience of staff on similar projects will be utilized. Priority of replacement will be based on inspections.

Reporting

Reporting will consist of the Manager submitting quarterly progress reports.

Note 1.1

Revision to match the five year budget.

2. WICKET GATE BUSHING REPLACEMENT PROGRAM

Background

Over the years, the Company has experienced a number of petroleum releases from its hydro plants. In some plants, the wicket gate bushing component requires greasing for proper operation of the turbine. Greasing of these bushings can result in the release of petroleum products into the environment. To reduce the number of these greased bushings in the system, the Company has identified plants where the bushings can be replaced with greaseless bushings.

The following objectives and targets were set:

Corporate

Corporate Generation Object #2

- Minimize the potential for petroleum releases due to greased bushings in 4 hydro plants between 2008 and December 31, 2012.

Corporate Generation Target #2

- Minimize the potential for petroleum releases due to greased bushings in 1 plant by December 31, 2010.

Subsequent targets will be set annually to coincide with budget preparation. The following department and group objectives and targets are set in order to realize those that were set corporately:

Operations Department

Generation Operations Dept Objective #2

- Reduce the release of petroleum products due to greased bushings into the environment originating from 4 hydro plants between 2008 and December 31, 2012.

Generation Operations Dept Target #2

- Make improvements to 1 plant by December 31, 2010.

Generation Group

Generation Operations Group Objective #2

- Reduce the release of petroleum products due to greased bushings into the environment originating from 4 hydro plants between 2008 and December 31, 2012.

Generation Operations Group Target #2

- Make improvements at Seal Cove Plant by December 31, 2010.

Responsibility

The responsibility for ensuring this program is completed and the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall corporate responsibility for the program rests with the Manager, Operations, Sean LaCour (See Note 2.1).

The responsibility for design and planning will be Superintendent, Generation Operations – Jennifer Williams.

Resources Required

The Superintendent, Generation Operations and Maintenance staff.

Methodology

Professional engineering principles and practices will be applied. Experience of staff on similar projects will be utilized.

Reporting

Reporting will consist of the Manager submitting quarterly progress reports.

Note 2.1

Manager responsibility for this program has changed due to organizational changes in Engineering and Operations.

3. RUNNER REPLACEMENT PROGRAM

Background

Inefficient use of water at Company hydro plants can require additional Bunker C to be burned at the Holyrood thermal plant. The Company seeks to maintain efficient use of water at its hydro plants. When a turbine runner requires replacement, the Company will seek an optimized design to ensure the most efficient use of water possible.

The following objectives and targets were set:

Corporate

Corporate Generation Objective #3

- Maximize the efficient use of water through installation of optimized runners at 5 Company hydro plants between 2008 and December 31, 2014.

Corporate Generation Target #3

- The Company will seek an optimized design when replacing runners to ensure the most efficient use of water. 1 turbine is targeted for replacement by December 31, 2010.

Subsequent targets will be set annually to coincide with budget preparation. The following department and group objectives and targets are set in order to realize those that were set corporately:

Engineering Department

Generation Engineering Department Objective #3

- Replace 5 turbine runners between 2008 and December 31, 2014.

Generation Engineering Department Target #3

- Replace 1 turbine runner by December 31, 2010.

Generation Group

Generation Engineering Objective #3

- Replace a turbine runner at 1 plant by December 31, 2010.

Generation Engineering Target #3

- Replace 1 turbine runner with an optimized runner at Seal Cove Plant by December 31, 2010.

Responsibility

The responsibility for ensuring this program is completed and the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall corporate responsibility for the program rests with the Manager, Engineering – Gary Murray.

The responsibility for designing, planning, and implementing the program will be Superintendent, Civil Engineering – Gary Humby (See Note 3.1).

Resources Required

Generation Engineering, Maintenance and Plant staff.

Methodology

Professional engineering principles and practices will be applied. Experience of staff on similar projects will be utilized.

Reporting

Reporting will consist of the Manager submitting quarterly progress reports.

Note 3.1

Superintendent responsible for this program has changed due to organizational changes in Engineering and Operations.

4. HYDROELECTRIC ENERGY PRODUCTION INCREASE

Background

Due to the high cost of producing thermal electricity at Holyrood, the Company is seeking ways to increase production at the existing hydro facilities. In 2007, the Company completed a capital upgrade at the Rattling Brook plant that reduced the required amount of bunker 'C' at Holyrood.

There are additional ways to increase production at other plants through improvements to operations, dams, penstocks and turbines. The Company completed a study in 2008 which provided an inventory of potential hydroelectric energy increase initiatives and also final engineering design for the most feasible projects.

By increasing hydroelectric generation at existing plants, the requirement for fossil fuel generation will be reduced. This will result in fewer emissions being emitted into the environment.

With this in mind the following objective was set:

Engineering Department

Generation Engineering Dept Objective #4

- Increase hydroelectric energy production at 6 Company hydro plants between 2009 and December 31, 2014.

Generation Engineering Dept Target #4

- **Complete engineering to increase energy production** at one hydro plant by December 31, 2010 (See Note 4.1).

Generation Group

Generation Engineering Dept Objective #4

- **Complete engineering to increase energy production** at one hydro plant by December 31, 2010 (See Note 4.1).

Generation Engineering Dept Target #4

- **Complete engineering to increase energy production at Sandy Lake Spillway by December 31, 2010** (See Note 4.1).

Responsibility

The responsibility for ensuring this program is completed and the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall corporate responsibility for the program rests with the Manager, Engineering – Gary Murray.

The responsibility for design and planning will be Superintendent, Civil Engineering – Gary Humby.

Resources Required

The Superintendent, Civil Engineering and staff for the design and specification portion of the project.

Methodology

Professional engineering principles and practices will be applied. Experience of staff on similar projects will be utilized.

Reporting

Reporting will consist of the Manager submitting quarterly progress reports.

Note 4.1

Construction deferred until 2011 due to approval issues.

5. BEARING OIL COOLING SYSTEM CONTROL ENHANCEMENT PROGRAM

Background

Over the years, the Company has experienced a number of petroleum releases from its hydro plants. The bulk of these releases originate with the bearing oil-cooling system that utilizes cold water from the penstock passing through a coil (to cool the oil) submersed in the bearing oil pot. If the cooling coil fails, water will fill the bearing pot, raising the oil level and forcing the oil out and resulting in a release. To address the issue, three controls have been identified for implementation.

The first control is the installation of a limit switch. These switches signal when a potential problem exists in the oil filled bearing pot and shuts down the plant if the oil level starts to rise above the normal level in the pot.

Secondly, the original design of the cooling coil utilizes the penstock water pressure, which is normally many times above what is required in the cooling coil. Pressure reduction valves are being used to bring the pressure down in the coils thus placing less stress on the coils.

Thirdly, the coils are being fitted with solenoid valves that actuate when the plant is shut down to stop the flow of water to the coils.

Applicability of one or all improvements will be evaluated on a plant basis.

The following objectives and targets were set:

Corporate

Corporate Generation Objective #5

- Minimize the potential for petroleum releases in 23 hydro plants between 2001 and December 31, 2011. (See Note 5.2)

Corporate Generation Target #5

- Minimize the potential for petroleum releases in 1 plant by December 31, 2010 (See Note 5.1).

Operations Department

Generation Operations Dept Objective #5

- Reduce the release of petroleum products into the environment originating from 23 power plants between 2001 and December 31, 2011.

Generation Operations Dept Target #5

- Minimize the potential for petroleum releases by making improvements to 1 plant around oil and oil filled equipment by December 31, 2010.

Generation Group

Generation Operations Group Objective #5

- Make improvements to 1 plant around oil and oil filled equipment by December 31, 2010 (see Notes 5.1 and 5.2)

Generation Operations Group Target #5

- Make improvements at Lockston Plant by December 31, 2010

Responsibility

The responsibility for ensuring this program is completed and the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall corporate responsibility for the program rests with the Manager, Operations – Sean LaCour (See Note 5.3).

The responsibility for design and planning will be Superintendent, Generation Operations – Jennifer Williams.

Resources Required

The Superintendent, Generation Operations and Maintenance staff.

Methodology

Professional engineering principles and practices will be applied. Experience of staff on similar projects will be utilized.

Reporting

Reporting will consist of the Manager submitting quarterly progress reports.

Note 5.1

Improvements related to the bearing oil cooling system at Mobile Plant have been deferred until further notice depending on the outcome of Water Use Negotiations with the City of St. John's. Any necessary maintenance will be completed at Mobile Plant as required.

Note 5.2

Improvements to minimize the potential for petroleum releases in hydro plants has been extended from year end 2010 to year end 2011 due to an increased work load.

Note 5.3

Manager responsibility for this program has changed due to organizational changes in Engineering and Operations.

6. LOOKOUT BROOK SUMP MODIFICATION PROGRAM

Background

The 2009 EMS Audit identified a concern of a potential release of a petroleum product from the sump pit of G4 unit when operating at Lookout Brook Plant. The concern focused on the possible release, however negligible, of a petroleum product into the tailrace.

The Company has procedures in place to minimize the potential of a release of petroleum products from the Company hydroelectric generating facilities and thereby minimizing the potential of a negative environmental impact. With that said the Company is committed to continual improvement and as a result of the identified concern above, completed an engineering review in late 2009. As a result of the review it has been decided to implement an engineering solution in 2010.

Generation Department

Generation Department Objective # 6

- Reduce the potential for incidental release of petroleum product from G4 Sump Pit at Lookout Brook Plant by December 31, 2010.

Generation Department Target # 6

- Implement solution by December 31, 2010.

Operations Department

Generation Operations Group Objective #6

- Implement a practical solution to reduce the risk of release of petroleum product into the tailrace from G4 Sump Pit at Lookout Brook Plant by December 31, 2010.

Generation Operations Group Target #6

- Implement solution by December 31, 2010.

Responsibility

The responsibility for ensuring this program is completed and the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall corporate responsibility for the program rests with the Manager, Operations, Sean LaCour.

The responsibility for design and planning and implementation will be the Superintendent, Generation Operations– Jennifer Williams.

Resources Required

Mechanical Engineer, Plant Staff

Methodology

Professional engineering principles and practices will be applied. Experience of staff on similar projects will be utilized to arrive at causal factors and recommendations.

Reporting

Reporting will consist of the manager submitting quarterly progress reports.

7. PCB PHASE-OUT PROGRAM

Background

Polychlorinated Biphenyls (PCB's) contaminated oil filled electrical equipment has been an operational issue with the Company for some years. The majority of the PCB problem was the result of cross contamination of mineral oil with PCB's during manufacture. This resulted in equipment manufactured during a certain time frame to have low level PCB - normally found in the range of 50 - 500 mg/kg. From the time that PCB's were recognized as a problem and to present, various initiatives have been deployed to remove PCB contaminated equipment from service. Early in the process, the Company concentrated on the high-risk areas. All oil filled equipment located in sensitive areas were addressed to ensure that concentration levels were less than 50 mg/kg PCBs, then all large pieces of oil filled equipment (volume greater than 1000 litres) were addressed. The remaining contaminated equipment is comprised of pole mounted distribution transformers located in non-sensitive areas and some oil filled equipment in various substations. It is estimated that approximately 4 percent of the remaining older vintage equipment is contaminated.

Note: PCB items such as street lighting capacitors, ballasts in florescent lighting fixtures in buildings, PILC cables and potheads will be addressed through attrition.

Breaker and transformer bushings, PT's, and CT's will be addressed in Objective and Target #8 "*Bushings and Instrument Transformer Phase Out Program*". Newfoundland Power has received an approval from Environment Canada to extend the end-of-use for bushings, CTs and PTs to December 31, 2014. (See Note 7.2)

The Company is determined to have all its oil filled electrical equipment in service meet a concentration level of less than 50 mg/kg PCBs. With this in mind, the following objectives have been set:

Corporate

Corporate T&D Objective #7A

- Eliminate PCB contaminated oil filled distribution equipment in service, which contains 50 mg/kg PCBs or more, by year end 2013 (See Note 7.1). To achieve this objective, targets have been set for 2010. (The equipment to be addressed under this objective includes the following distribution equipment: distribution transformers, distribution regulators and distribution metering tanks.)

Corporate T&D Target #7A

- Eliminate PCB contaminated oil filled distribution equipment, which contains 50 mg/kg PCBs or more, on 24 feeders by December 31, 2010. Subsequent targets will be set annually to coincide with budget preparation.

Corporate T&D Objective #7B

- Eliminate PCB contaminated oil filled substation equipment in service, which contains 50 mg/kg PCBs or more, by 2014. To achieve this objective targets have been set for 2010.
(The equipment to be addressed under this objective includes the following substation equipment: power transformers, oil filled breakers, reclosers, metering tanks.)

Corporate T&D Target #7B

- Eliminate PCB contaminated oil filled substation equipment, which contains 50 mg/kg PCBs or more, from 4 substations by December 31, 2010. Subsequent targets will be set annually to coincide with budget preparation.

Based on Corporate T&D Objective and Target #7A, the following have been established.

Eastern Region

Eastern Region Objective #7A

- Eliminate PCB contaminated oil filled distribution equipment, which contains 50 mg/kg PCBs or more, in Eastern Region by December 31, 2013 (see Note 7.1).

Eastern Region Target #7A

- Make 16 feeders non PCB by the end of 2010.

St. John's Area Objective #7A

- Eliminate PCB contaminated oil filled distribution equipment, which contains 50 mg/kg PCBs or more, on 10 feeders by December 31, 2010.

St. John's Area Target #7A

- Make the following feeders less than 50mg/kg PCBs by the end of 2010:
RRD-02 RRD-08 SJM-06 SLA-13
RRD-04 RRD-10 SJM-09
RRD-07 SJM-02 SJM-11

Avalon Area Objective #7A

- Eliminate PCB contaminated oil filled distribution equipment, which contains 50 mg/kg PCBs or more, on 2 feeders by December 31, 2010.

Avalon Area Target #7A

- Make the following feeders less than 50mg/kg by the end of 2010:
Whitbourne SCT-01
Carbonear HOL-02

Clareville/Burin Area Objective #7A

- Eliminate PCB contaminated oil filled distribution equipment, which contains 50 mg/kg PCBs or more, on 4 feeders by December 31, 2010.

Clareville/Burin Area Target #7A

- Make the following feeders less than 50 mg/kg PCBs by the end of 2010:
Burin MSY-03
Clareville CAT-01 CLV-03 LET-01

Western Region

Western Region Objective #7A

- Eliminate PCB contaminated oil filled distribution equipment, which contains 50 mg/kg PCBs or more, in Western Region by December 31, 2013 (see Note 7.1).

Western Region Target #7A

- Make 8 feeders less than 50 mg/kg PCBs by the end of 2010.

Grand Falls/Gander Area Objective #7A

- Eliminate PCB contaminated oil filled distribution equipment, which contains 50 mg/kg PCBs or more, on 7 feeders by December 31, 2010.

Grand Falls/Gander Area Target #7A

- Make the following feeders less than 50 mg/kg PCBs by the end of 2010:
Gander COB-03 GAN-03 HBS-02 TRN-02
GAM-01 GBY-02 TRN-01

Corner Brook Area Objective #7A

- Eliminate PCB contaminated oil filled distribution equipment, which contains 50 mg/kg PCBs or more, on 1 feeder by December 31, 2010.

Corner Brook Area Target #7A

- Make the following feeders less than 50 mg/kg PCBs by the end of 2010:
HUM-04

Stephenville Area Objective #7A

- All PCB contaminated oil filled distribution equipment, which contains 50 mg/kg PCBs or more has been eliminated from Stephenville Area.

Based on Corporate T&D Objective and Target #7B, the following has been established.

Engineering Department

Engineering Department Objective #7B

- Eliminate PCB contaminated oil filled equipment located in substations, which contains 50 mg/kg PCBs, or more by December 31, 2014.

Engineering Department Target #7B

- Make 4 substations less than 50 mg/kg PCBs by the end of December 31, 2010.

Substations Engineering Group Objective #7B

- Eliminate PCB contaminated oil filled equipment, which contains 50 mg/kg PCBs or more, in 4 substations by December 31, 2010.

Substations Engineering Group Target #7B

- Make the following substations non PCB by the end of 2010:
Deer Lake Mobile Berry Head Gallants

Responsibility

The responsibility for conducting this program and ensuring the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall responsibility for the program rests with the managers involved. These are:

Eastern Region – Mike Jardine
Western Region – Scott Ainsworth
Gary Murray – Manager, Engineering (See Note 7.3)

The responsibility for the area objectives and targets rest with the Superintendents of Area Operations and the Superintendent, Electrical Engineering. These are as follows:

St. John's – Dave Manning
Carbonear/Whitbourne – Doug Chafe
Clarenville/Burin – Barry Keating
Grand Falls/Gander – Bob Daye
Corner Brook – Carl Bishop
Stephenville – Wayne Green
Superintendent, Electrical Engineering – Peter Feehan (See Note 7.3)

Resources Required

Technicians, line crews, maintenance men
Oil filled equipment (transformers, reclosers, etc)

Reporting

Reporting will consist of the managers responsible submitting the names of the distribution feeders or substations completed each quarter.

Note 7.1

The phase out date for the elimination of PCB contaminated oil filled distribution equipment in service has been extended from year end 2011 to year end 2013 due to an increased work load.

Note 7.2

This application is made on the understanding that the proposed extension is a temporary measure to maintain compliance with the new PCB Regulations. It is our expectation, and our understanding, that the current regulations will be amended to allow the use of equipment such as bushings and instrument transformers in substations until 2025).

Note 7.3

Responsibilities for this program has changed due to organizational changes in Engineering and Operations

8. BUSHINGS AND INSTRUMENT TRANSFORMER PHASE OUT PROGRAM

Background

Newfoundland Power's existing PCB phase-out program as outlined in its Environmental Objectives and Targets is scheduled for completion in 2014.

The existing Program excludes breaker and transformer bushings as well as street lighting capacitors, ballasts in florescent lighting fixtures in buildings, potheads, PILC cables (Refer to Objective and Target # 7 " *PCB Phase Out Program*") These were to be addressed through attrition as they are removed from service. In September 2008, Environment Canada published the PCB Regulations which required the elimination of all equipment containing PCBs in a concentration of 500 mg/kg or more by December 31, 2009.

In consultation with Environment Canada, the electrical utility sector is recommending that bushings and instrument transformers be included in the 2025 end-of-use deadline to facilitate orderly replacement through attrition, testing and replacement programs.

Environment Canada recognizes the dilemma presented as a result of the 2009 end-of-use date and has put forth a proposal that would hopefully extend the end-of-use deadline to 2025. The proposal includes:

1. Each utility, at their discretion, would apply for an end-of-use extension that, if approved by Environment Canada, would extend end-of-use deadline to December 31, 2014. This would allow time for an amendment to the 2008 Regulations.
2. Senior officials at Environment Canada are proposing an amendment to the PCB Regulations that would extend the end-of-use date for bushings and instrument transformers out to December 31, 2025. Initiation of this amendment is tentatively scheduled to begin in early summer of 2010 with an anticipated completion date for release for Gazette II in approximately 2 years.

As a result of the above proposals, the Company has applied for an end-of-use extension for six known bushings on KEL-52L-B that have a PCB concentration levels greater than 500 mg/kg. In addition to the six known bushings, the Company has also applied for an end-of-use extension ending December 31, 2014 on 2,330 bushings where the PCB concentration level is unknown.

Considering the uncertainty of the proposed changes to the PCB Regulations, the following objectives have been set for 2010.

Corporate

Corporate Engineering Objective #8A

- Replace one oil filled breaker whose bushings have a PCB concentration level of 500 mg/kg PCBs or more by October 30, 2010.

Corporate Engineering Target # 8A

- Replace breaker and associated bushings with a PCB concentration level of 500 mg/kg or more by October 30, 2010.

Corporate Operations Objective # 8B

- Complete testing of bushings on units that an oil sample can be taken from on power transformers and bulk oil filled breakers that are to be removed from service for maintenance in 2010. Bushings that are tested at 50 mg/kg or greater will be identified for replacement. Testing shall be completed by December 31, 2010.

Corporate Operations Target # 8B

- Complete testing of bushings on units that an oil sample can be taken from on power transformers and bulk oil filled breakers that are to be removed from service for maintenance in 2010. Bushings that are tested at 50 mg/kg or greater will be identified for replacement. Testing shall be completed by December 31, 2010.

Engineering Department

Engineering Department Objective # 8A

- Replace existing oil filled breaker and associated bushings having a known concentration level of 500 mg/kg PCB or more by October 30, 2010.

Engineering Department Target # 8A

- Replace KEL-52L-B oil filled with a SF6 breaker by October 30, 2010.

Operations Department

Operations Department Objective # 8B

- Complete testing of bushings that can be oil sampled on 17 power transformers and 9 bulk oil filled breakers by December 31, 2010.

Operations Department Target # 8B

- Complete testing of bushings that can be oil sampled on 17 power transformers and 9 bulk oil filled breakers by December 31, 2010.

Responsibility

The responsibility for ensuring this program is completed and the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall corporate responsibility for the program rests with the managers involved. These are:

Manager, Engineering - Gary Murray – Engineering Objectives and Targets

Manager, Operations – Sean LaCour – Operations Objectives and Targets

The responsibility for objectives and targets rest with the Superintendents involved.

These are:

Superintendent, Electrical Engineering - Peter Feehan - Engineering Objectives and Targets

Superintendent, Electrical Maintenance – Rick Spurrell - Operations Objectives and Targets

Resources Required

Designated Superintendents and staff.

Methodology

Professional engineering principles and practices will be applied. Experience of staff on similar projects will be utilized to arrive at causal factors and recommendations.

Reporting

Reporting will consist of the manager submitting quarterly progress reports.

9. SULPHUR HEXAFLUORIDE (SF₆) MANAGEMENT PROGRAM

Background

Sulphur hexafluoride (SF₆) is a persistent greenhouse gas. Its Global Warming Potential (GWP) is estimated to be 23,900 Carbon Dioxide (CO₂) equivalent (over a period of one hundred years). SF₆ is a synthetic gas used as an arc extinguishing and insulating medium in electrical equipment. This gas can at times be released during the operation and maintenance of circuit breakers.

As of year end 2006, the Company had 82 SF₆ circuit breakers in service. The quantity of SF₆ will increase in the future as more SF₆ equipment is added to the system (there is no functionally equivalent substitute gas currently available to replace SF₆).

SF₆ releases can be controlled through best management practices such as; SF₆ recovery, reuse and recycling utilizing specialized equipment and SF₆ leaks can be detected using leak detection technologies and minimized by maintaining or replacing the SF₆ insulated equipment.

A number of years ago the Company started to address the SF₆ issue through a number of initiatives such as:

- Purchasing SF₆ Gas Reclaimers to capture SF₆ gas during maintenance which significantly reduces the quantity of SF₆ being released.
- Maintaining SF₆ circuit breakers to include bushing gasket replacement and checks on the integrity of the SF₆ gas containment system.

The Company has an ongoing 10 year regular maintenance cycle for all SF₆ breakers. These breakers were built by various manufactures and are of various vintages. Based on service history it has been determined that the Westinghouse/Siemens breakers which have been in service for some time have a higher potential to release SF₆ gas compared to breakers from other manufacturers. There were 30 of these Westinghouse/Siemens breakers in service as of year-end 2006. Over the last several years the Company adopted a more focused approach in eliminating our most troublesome units through replacements with refurbished or new breakers. In mid-2008, it was decided that the Company would no longer be refurbishing the Westinghouse/Siemens breakers, rather these will be replaced with new units (see Note 9.1). As of year end 2009, there were 23 units which had been refurbished or replaced with new.

The Company is determined to continue to ensure that SF₆ gas is managed in an environmentally responsible manner. With this in mind the following objective has been set to proactively impact the possibility of future SF₆ gas release into the environment.

Engineering Department

Engineering Department Objective #9

- Replace 12 Westinghouse/ Siemens SF₆ breakers by December 31, 2013. To achieve this objective, targets have been set for 2010.

Engineering Department Target #9

- Replace the following 4 Westinghouse/Siemens SF₆ breakers by December 31, 2010.

RRD-32L-B

RRD-67L-B

MAS-351L-B

STV-405L-B

(See Note 9.2)

Subsequent targets will be set annually based on number of failed units and to coincide with budget preparation.

Responsibility

The responsibility for conducting this program and ensuring the objective and target is met coincides with the levels and functions at which the objectives are set. The overall responsibility for the program rests with Gary Murray, Manager , Engineering. (See Note 9.3)

The responsibility for ensuring that the identified breaker replacements is conducted on the SF₆ equipment will be the Superintendent, Electrical Engineering – Peter Feehan (See Note 9.3)

Resources Required

Engineering staff, Electrical Contractors, Boom Truck Contractor, Line Crew, SF₆ breakers and SF₆ Reclaimer.

Reporting

Reporting will consist of the Manager responsible submitting the substation breaker numbers for the SF₆ circuit breakers that have been purchased each quarter.

Note 9.1

The success rate with refurbished breakers has been less than expected and as a result a decision was made in 2008 to replace the remaining identified breakers with new replacements units rather than refurbished units.

Note 9.2

Actual units replaced will be dependent upon leakage rates.

Note 9.3

Responsibilities for this program has changed due to organizational changes in Engineering and Operations.

10. MINI-PADMOUNT TRANSFORMER ACCELERATED REPLACEMENT PROGRAM

Background

Spills from mini-padmout transformers have been an operational issue with the Company for a number of years. The problem is due to corrosion deteriorating the structural integrity of the steel casing to an extent where oil is released into the environment. Since this rust occurs underneath the unit it is difficult to identify during a routine inspection. Therefore the Company plans to identify and replace a number of the older units which it believes has the highest risk of a spill. As per the current practice the new replacement units will be constructed of stainless steel rather than the mild steel which was used in the past. This program will be implemented in the St. John's area where the vast majority of the older mini-padmouted transformers are in service. Also, as per the Company's current practice, all new padmounted transformers which are purchased for either replacement or new services will be of stainless steel construction.

St. John's Area Objective #10

- Replace 100 mini-padmout transformers in the St. John's area with stainless steel between 2007 and 2011. (See Note 10.1)

St. John's Area Target #10

- Replace 15 mild steel mini-padmout transformers with stainless steel units by December 31, 2010.

Subsequent targets will be set annually to coincide with budget preparation.

Stephenville Areas Objective #10

- Replace 7 mini-padmout transformers in the Stephenville Area with stainless steel by 2010.

Stephenville Area Target #10

- Replace 3 mild steel mini-padmout transformers with stainless steel units by December 31, 2010.

At the end of each year a review of this program will be conducted to determine if any changes are to be made to the scope of this program.

Responsibility

The responsibility for conducting this program and ensuring the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall responsibility for the program rests with the Manager of Eastern Region, Mike Jardine and Manager of Western Region, Scott Ainsworth.

The responsibility for the area objectives and targets rest with the Superintendent, Regional Operations for the St. John's Area, Dave Manning, and the Superintendent Regional Operations for the Stephenville Area, Wayne Green. (See Note 10.2)

Resources Required

Technicians, Line Crews, Maintenance Men, Stainless Steel Mini-Padmouted Transformers

Reporting

Reporting will consist of the managers responsible submitting the identification Company numbers for all mini-padmout transformers which were replaced each quarter.

Note 10.1

The completion date of this program to replace 100 mini-padmout transformers in the St. John's area with stainless steel between 2007 and 2010 has been extended to 2011 due to increased workloads.

Note 10.2

Responsibilities for this program has changed due to organizational changes in Engineering and Operations.

11. MERCURY VAPOUR STREET LIGHT REPLACEMENT PROGRAM

Background

The Company maintains approximately 56,000 streetlights providing street and area lighting throughout its service territory, including approximately 7,000 Mercury Vapour (MV) streetlights. These MV streetlights are not as energy efficient as the High Pressure Sodium (HPS) streetlights that have replaced the MV units as the Company standard. Through normal attrition approximately 538 MV streetlights are replaced each year. At the current replacement rate it will take approximately 13 years to remove all of the remaining 7,000 MV streetlights from the distribution system.

In 1982, Newfoundland Power's street lighting standard was changed from MV to HPS streetlights. The change was justified on the improved efficiency of the HPS lamps, with the HPS lamp providing higher light output at lower wattages and associated energy savings. There has been no MV streetlight fixtures purchased since the standard was changed in 1982. Replacement lamps and some components have been purchased, and limited repairs have been completed on existing fixtures. Therefore all remaining MV streetlight fixtures were purchased prior to the 1982 change in standard. At an age in excess of 26 years, these fixtures have an in service life greater than what would normally be expected.

The HPS energy efficient streetlights provide the same quality of area lighting while consuming less electricity. For example, 175 watt MV lamps may be replaced by more efficient 100 watt HPS lamps to realize energy savings of more than 35% while providing the same light output.

There are approximately 7,000 MV street lights remaining in service. Collectively, they have the potential to reduce the energy consumption attributable to street lighting by 2,184 MWh on an annual basis. During time of system peak, replacing these 7,000 street lights with the more energy efficient HPS lamp, would remove approximately 0.5 MW from the system peak.

The reduction in energy consumption will also result in less fuel having to be burnt at the Holyrood generating plant. An annual energy reduction of 2,184 MWh is equivalent to not burning approximately 3,470 barrels of oil per year at the Holyrood generating plant. This results in an annual reduction in carbon dioxide (a greenhouse gas) of approximately 1675 tonnes.

By replacing these older MV street lights there is the added benefit of removing lighting fixtures which have a higher probability of containing PCB. The majority of the mercury vapour lights which the Company purchased were manufactured at a time when PCB was approved for use. By removing these older fixtures one will phase out any remaining PCBs associated with our street lighting fixtures.

With this in mind the following objective was set:

Corporate

Corporate Objective #11

- Replace all remaining mercury vapour street lights (approximately 7000 units) by December 31, 2011.

Corporate Target #11

- Complete survey of location of remaining mercury vapour street lights and replace approximately 2,950 units by December 31, 2010.

Responsibility

The responsibility for ensuring this program is completed and the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall corporate responsibility for the program rests with Managers, Mike Jardine (Eastern) and Scott Ainsworth (Western).

The responsibility for daily operational matters pertaining to this replacement program will be Superintendent, Regional Operations Whitbourne/Carbonear, Doug Chafe (see Note 11.1).

Resources Required

The Superintendents, staff and contractors.

Methodology

Professional engineering principles and practices will be applied. Experience of staff on similar projects will be utilized.

Reporting

Reporting will consist of the Managers submitting quarterly progress reports.

Note 11.1

Responsibility for this program has been given to Superintendent, Regional Operations Whitbourne/Carbonear, Doug Chafe.

12. CUSTOMER ENERGY CONSERVATION PROGRAM

Background

In June 2008, Newfoundland Power and Newfoundland and Labrador Hydro completed a five year conservation plan entitled the *Five-Year Conservation Plan: 2008 – 2013* (the Plan) which outlined specific programs to deliver energy efficiency savings to customers over the next five years, with the expectation that the Plan would evolve with the Province's conservation activities. The plan, as revised in the fall of 2008, forecast annual energy savings that by the end of 2013 total 70 GWh. The plan included savings from three residential conservation programs, one commercial program and one industrial program. Newfoundland Power's portion of the total energy savings was forecast to be 20 GWh.

The three residential programs were launched during a joint utility retail event in June 2009 followed by the Commercial Lighting Program in August. The industrial program is being administered by Hydro and is not available to Newfoundland Power's customers. The Company and Hydro collaborated throughout the year to increase awareness and participation in these programs as well as provide energy conservation information and advice to its customers.

Implementation of these programs in June 2009, was a delay of approximately six months. As a result, forecast savings has also been reduced.

These programs are anticipated to produce overall cost savings to customers by reductions in energy supply costs and the need to add generation capacity. The primary benefit will be the reduction of fuel used to produce electricity at Hydro's Holyrood generating plant. From an emissions perspective, annual energy reduction of 70 GWh is equivalent to not burning approximately 111,000 barrels of oil per year at the Holyrood generating plant. This results in an annual reduction in carbon dioxide (a greenhouse gas) of approximately 54,000 metric tonnes (based on conversion figures from 2005).

By promoting energy conservation in Newfoundland and Labrador there is the added benefit of fostering a cultural shift throughout the province, a shift towards increased energy and resource efficiency. The energy saving benefits noted above are estimated savings to the Company that are directly related to the programs savings and do not include the benefits of increased conservation awareness that will contribute to energy savings, but will not be tracked.

With this in mind the following objective was set:

Corporate

Corporate Objective #12

- To encourage our customers to conserve energy through energy conservation programs, information sessions and advertising. Through the

programs implemented in 2009 it is expected that these programs will reduce the Company's sales by 15 GWh during 2013 (this is participants savings less an estimate of those would have implemented the changes without the programs).

Corporate Target #12

- The following table provides the targeted participants savings required to meet the forecast net savings of 15 GWh in as per the plan.

Year	Participant Savings (GWh)	Savings During 2013 (GWh)
2009	0.6	2.1
2010	2.3	4.4
2011	2.7	5.1
2012	3.0	5.7
2013	3.3	3.3
Total savings in 2013 ¹		20.6

1 – Total Participant Savings of 20.6GWh in 2013 is greater than 15 GWh to account for the potential that some customers may have implemented the cost savings measures without the conservation program

Responsibility

The responsibility for ensuring this program is completed and the objectives and targets are met coincides with the levels and functions at which the objectives are set. The overall corporate responsibility for the program rests with Managers, Peter Collins (Customer Relations) and Lorne Henderson (Regulatory).

The responsibility for daily operational matters pertaining to customer energy conservation program will be Director, Energy Conservation, Sherina Wall.

Resources Required

The Directors, staff and contractors.

Methodology

Professional engineering principles and practices will be applied, advertising expertise will be contracted and experience of staff on similar projects will be utilized. Existing sales and service channels will be employed to deliver energy conservation services to customers.

Reporting

Reporting will consist of the Managers submitting quarterly progress reports.